RAILROAD GAZETTE

FRIDAY, FEBRUARY 11, 1898.

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Contributions.

The Manhattan and the Boulevard.

NEW YORK, Feb. 6.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I observe that you and other mugwumps have a good deal to say against the destruction of the trees along the middle of the Boulevard. Has it never occurred to you, or are you afraid to say it, that the plan adopted by the Rapid Transit Commissioners would destroy every tree in the middle of the Boulevard? Of course you know that the project is for doing the work from the surface. The trees which do not survive that operation would die later for want of nourishment. COMMON SENSE.

[It is of no use and serves no good purpose to say all the exasperating things that you think of, besides, we are not sure that the statement is true. One of the misfortunes of the whole situation is that a great number of the people who have undertaken to consider it, either officially or as volunteer amateurs, have proceeded to inflame themselves and their antagonists. Probably few great enterprises of such importance as this have been discussed—if we may call it discussion—with so much ignorant bad temper and so little candid looking at facts. We might, for instance, on the one side, have said that it is difficult to see how the Manhattan Company can run many fast trains with the multiplied grade crossings which their new project may involve. Being entirely ignorant of any scheme that they might have for avoiding those grade crossings, we refrained from discussing that side of the subject. Of course Mr. Parsons has been obliged, as the engineer of the Commissioners, to point it out to them.—EDITOR RAILROAD GAZETTE.]

To Reverse or Not?

NEW YORK, Feb. 1, 1898.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In reply to yours of Jan. 28, I am decidedly of the opinion that with a properly braked locomotive, it is a disadvantage to reverse in order to make a quick stop. The maximum retarding force is obtained when the wheels are held just short of the sliding point and this result is obtained with a properly designed driver brake. By reversing the engine, we either lock the wheels or cause them to revolve in a reverse direction, in either of which cases we will not obtain as short a stop as in the first case.

Our instructions to engineers in case the necessity arises for a quick stop are to apply the brakes and close the throttle, but not to reverse.

My observation when running an engine led me to the same conclusion, although in the day when we had no driver brakes we arrived at this result in a different way. Then we *did* reverse, but regulated the throttle so as to develop sufficient counter pressure in the cylinders to hold the wheels just short of the sliding point—in other words, to obtain the same effect that we do now by the application of the brake. S. M. P.

The Westinghouse Air Brake Company,
NEW YORK, Feb 2, 1898.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It appears to me that there can be no question about the inadvisability of reversing locomotives where suitable driver brakes are provided. That a greater braking power could be effectively employed upon the driving wheels at high speeds is undoubtedly a fact; but it is an equally evident fact that the reversal of the engine cannot profitably be employed for this purpose. When a greater braking power is used at high speed, it must be one of established limit, and not one that is likely to initiate wheel sliding, for, after the wheels have once begun to slide, the ordinary driver brake force is generally sufficient to prevent the wheels from again rotating.

There thus appears to be no case in which reversing the engine is excusable, except where driver brakes are lacking or where they are practically worthless. In the latter case, the moral is obvious, and points to improved driver brakes rather than to adopting the principle of reversing the engine. R. A. PARKE.

An American Observer in Europe.

BERNE, Switzerland, Dec. 27, 1897.

TO THE EDITOR OF THE RAILROAD GAZETTE:

If there is any point where the European railroad, speaking broadly, has an advantage of the railroads of the United States the writer has failed to find it. Without going into a comparison on technical grounds, or discussing the subject as perhaps an engineer ought to do, he desires to treat the matter from the standpoint of a traveler who has made journeys during a quarter of a century in the United States, Mexico, and Europe, covering over 200,000 miles, with his eyes open and his senses acute.

There are two or three features of English roads superior to those of the United States—solidity of construction, high speed through densely populated districts, the perfection of signaling and the general absence of grade crossings; but none of these excellences exists in any other European country.

On the continent the rail is fairly heavy and of the American pattern, but the majority of the roads have short rails, not over 20 to 24 ft., mostly 20 ft., and always even jointed. The roadbed being generally solid and well ballasted, why should those short rails be laid with even joints, and, what is worse, with usually a short, light fishbar instead of an angle plate? As it is, there is a most disagreeable bumping along on low joints amazingly close together.

If the train is fast—which means 30 to 35 miles an hour—the frogs are so made or so laid that the jump across the opening is terrific; and when the train for any reason crosses, under speed, from one track to another the curvature is so great as almost to dislocate the traveler's vertebra. Again, little attention is given to gage. This a measurement will show, but riding over the track at fair speed will instantly disclose the defect on almost any continental road. This serious defect, coupled with the weak and swaying springs of the cars, results sometimes, as the writer can testify, in absolute pain and contortions of the body and inability to sit quietly. One is, most of the time, sliding and twisting in an unavailing effort to hold himself together. The writer on several occasions estimated the lateral motion of his knees or feet (if one leg was thrown over the other and those of his fellow travelers, and the average movement was about 6 in. Another inexcusable defect which would, if found on an American road, lead to the discharge of the master mechanic is the almost universal use of "flat wheels," many of them very flat. Thus, with 20-ft. rails, low even joints, out-of-gage track, wide open frogs, weak springs and flat wheels, there is no comfort whatever except at an intolerably slow speed. Added to these defects is the general lightness and shortness of the cars, making them deficient in stability.

There are in Holland some very comfortable corridor cars of fair size, and also in Switzerland. Some of the long-distance through trains are equipped with cars that are comfortable compared with most of those to be found on the short routes of day travel. One great defect is the want of ventilation—a total want.

The habit of carrying everything possible into the car with you results from the strict charge for "excess" baggage. In most countries, except Great Britain, it is *all* excess baggage; that is, there is no weight allowed to go free. This naturally induces people to take their heavy baggage with them into the little compartments. The writer remembers one uncomfortable ride from Vienna to Zurich in one of the best sleepers on one of the best routes. There were four people in the compartment and four narrow berths. There was between the seats a small table. One of the passengers had a large Gladstone bag, a smaller satchel, a two-story leather hatbox and two enormous canvas shawl straps. These were on the table, under the table, between his knees and those of the writer's companion, in the racks, everywhere. There was no place in the car for storing any such truck. A florin to the porter would not have relieved the congested situation, for *he* had no place for anything.

The toilet room in the car was as good as is usually found in European sleepers; it was scarcely large enough for one person without bringing your elbows against the sides of the narrow box, and this was the only place in the car to wash, though the car was intended to hold 16 persons. The writer waited, standing in a narrow aisle, nearly half an hour, with his clothes on his arm, for the occupant of this one-man toilet room to arrange what was evidently a very elaborate toilet—possibly a bath. Most of the sleeping cars have very poor ventilation and very inefficient plumbing in the watercloset—often with no flushing trap—and yet these are called trains *de luxe*.

The little comforts and conveniences of a Pullman or Wagner car are sorely missed. We miss even that invariable little hook for your clothes at the head of your berth; a smoking room in the morning adjoining the toilet room, where you can lay your clothes, and, if not very crowded, dress yourself after washing; a wide berth that you can turn over in, and a colored porter who is not too delicate to do anything for you. The writer has been told that a first-class vestibuled American train of cars, with an American locomotive, is to be put on one of the railroads leading out of Paris during the Exposition of 1900. It is to be hoped that it will not be modified in any way to suit the demands or whims of European railroad officials. The so-called "Pullman" cars of the International Sleeping Car Co. bear little resemblance to a real Pullman.

There is one feature which might well be adopted more extensively in the United States—the station porter, who takes your hand luggage from the carriage to the train, and vice versa. In Europe there are always plenty of them. The introduction of the station porter at the Grand Central Station, New York, the Pennsylvania Railroad stations and at some other of the more important stations in the United States, ought to be followed by the same everywhere. That most desirable railroad employee ought to be put on between the elevated railroad stations and the Jersey City stations, for, after all, that route is the nearest to absolute despair of any in the world.

It is not the purpose of this letter to state advantages or disadvantages in respect to the movement and handling of freight, but there might be written an interesting letter on that branch of the subject.

After being subjected to all the annoyances and costs of European travel, with its classes, its excess baggage, its slowness and delays, its bad ventilation, its jerky, little cars, there comes into the mind, unasked but persistent, a desire to have a real, good, comfortable ride once more in a Pennsylvania passenger coach—we wouldn't ask for a parlor car—from New York to Philadelphia—a desire nearly as strong as that which all Americans over here have at this Christmas time for a first-class mince pie, which cannot be had in Europe.

E. L. CORTHELL.

The Mass Diagram in Earthwork.

In our issue of Dec. 17, page 885, appeared a paper by Prof. Walter L. Webb on the use of the mass curve in earthwork computation. The paper was presented at about the same date by Professor Webb before the Engineers' Club of Philadelphia, and in the last volume of the Transactions of that Club we find the paper and also a report of the discussion had at the meeting. Some parts of this discussion follow.

L. Y. SCHERMERHORN: It occurs to me that the mass curve involves the difference between place measurement and fill which has to be assumed. Professor Webb assumed it as 10 per cent. of earth; 10 per cent. to 12 per cent. is about the average taken by engineers. It must differ in all classes of material. In our experience the question is asked, what is the difference between scow and place measurement? It is very frequently assumed at 20 per cent., that is that scow measurement is 20 per cent. in excess of place measurement. We find from observation in material largely composed of sand that scow measurement exceeds place measurement by about 12 to 15 per cent. If the material is gravel it may be as low as 10 per cent. In clay, which comes up in quite large masses in the dippers and goes to the scow in that condition, we find the scow measurement increased as high as 25 per cent. So in gravel, where the coefficient is least to the plastic clays, where the coefficient is largest, we have a difference probably of 15 per cent. In railroad work there would not be quite so wide limits as I have indicated, but they would vary considerably from 10 per cent.—perhaps more upon the far side of 10 per cent. than from the near side. It seems to me that the argument Professor Webb makes must be based upon an arbitrary conclusion as to the relation between the measurement of excavation and fill.

PROFESSOR WEBB: I may have been misunderstood in regard to the matter of coefficient of shrinkage. There is no necessity for employing the same coefficient throughout. . . . The engineer must always vary his calculation according to the conditions, and so it depends upon the judgment of the engineer as to what will be the coefficient of expansion.

Mr. NICHOLLS: Not only the height of the embankment, but the method of handling cuts a figure. We know that whether we use the drag or wheel scraper, and the method in which you deposit it in the bank, whether from a narrow ridge in center, or whether you bring it up level from the bottom all through, makes a difference in the shrinkage. . . . It is a matter of estimate, and if left open each man can estimate according to his own judgment.

THOS. G. JANVIER: Regarding coefficient for shrinkage, in all my practice I have foreseen the trouble with the contractor in reference to that, and have made my specifications to cover it by saying that the contractor will be paid for his excavation measured in the excavation, no allowance for fill. In that way there is no allowance for settlement, and if the contractor understands that in the beginning he is perfectly satisfied with the measurements, and there has never been any dispute about allowance for shrinkage. . . .

Mr. LEHMAN: I think I see how this mass curve can be used for the purpose of ascertaining the ideal grade line in a railroad location. . . . A line once staked out, next in order is the fixing of a suitable grade line

to it. As there is no definite rule by which this can be done, it is always a difficult task to those not particularly experienced in such work. This experience is about all the locating engineer has to depend on, and with it and by "rule of thumb" he usually settles the question. Hence I can see how the mass curve method might reduce such labor to much more exactness and lessen the difficulty of equalizing the excavation and embankments and adjusting them to the maximum grade.

It appears to me, however, that the use of the mass curve should be called into service, if available at all, before the work of construction begins, rather than after, and not only used in the questions of haul. I know well the difficulty of establishing a theoretically correct grade line on a fixed location. As far as I know there are no satisfactory rules to govern this, and if the mass curve will prove effective to this end it will certainly be a boon to the locating engineer.

THE PRESIDENT (Mr. J. T. Richards): We pay for the material taken from the excavation and nothing measured in the fill. We also avoid classification as far as practicable, *i. e.*, the contractor takes rock and earth and everything he finds in the cut, all at the same price per cubic yard. In some cases I have put railroad work under contract at a price per mile, for all graduation complete, ready for the ballast and track. This further simplifies the matter and eliminates completely all classification and price per quantity of material moved—and has the advantage of enabling those interested in building a railroad to know to a certainty what it will cost as soon as it is placed under contract to a responsible contractor. This I would recommend where the grading is light. For very heavy cutting and filling, with bridge work, it is a little too general.

Contractors are not ignorant by any means. They are generally shrewd, intelligent business men—that is a successful and reliable contractor—and to-day, to make himself fully equipped, associates himself with an engineer; so the two are found to be a little more than equal to the engineer on the other side of the contract. So it is well to eliminate the old method of classification for earth, loose rock, solid rock, and hard pan, so common to all of us, and it will save us from much discussion and difficulties, often very hard to settle, and not unfrequently ending in the courts. I think, nevertheless, that this graphical method laid down by Prof. Webb will be very beneficial in many ways.

MR. NICHOLLS: Prof. Webb's paper is important on overhaul in determining the manner in which material shall be handled. It is a common thing to say no earth shall be wasted above the grade between certain points. The contractor, as a general rule, wants to know where he is going to dispose of that material; and if bound down by certain regulations and restrictions he wants to know what his overhaul is going to be. That is where the method will have the most value.

Two New Grand Trunk Locomotives.

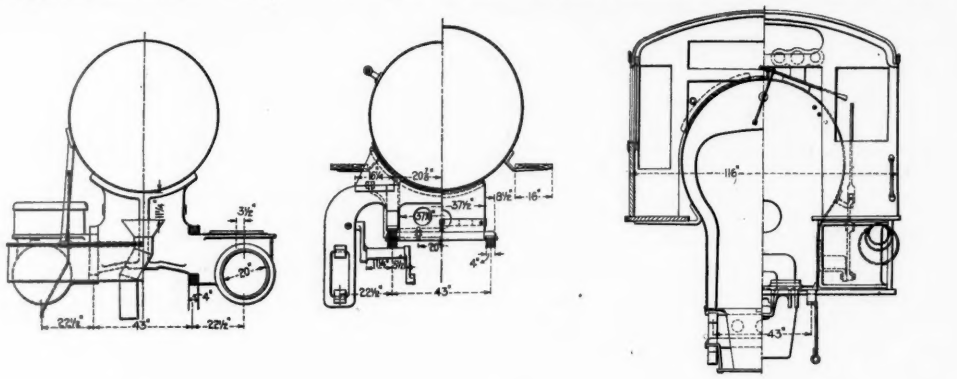
In this issue we illustrate the new 10-wheel passenger engines recently adopted as the standard for the Grand Trunk Railway, and the principal dimensions are also given for the new standard mogul freight engines for the same road. In designing these new classes of locomotives the intention has been to combine the best features of a number of recent designs; so that while all the details have received unusual attention, both from Mr. F. W. Morse, Superintendent of Motive Power of the Grand Trunk, and from the manufacturers, and such parts have been made especially substantial, there are no special features which have not already been illustrated and described in the *Railroad Gazette*, in connection with other engines. It is interesting however to note that while the passenger and freight locomotives are designed for particular classes of service, yet the parts which will require repairs and renewals are the same for both engines, which undoubtedly will reduce considerably the cost of maintenance; we do not recall an instance where the idea of interchangeable parts has been more fully carried out. The passenger engines have a greater total weight than the freight engines of 14,500 lbs., but less weight on the drivers by 3,000 lbs.; the passenger engines also have larger driving wheels and a longer boiler, the latter resulting in a slightly greater heating surface for the 10-wheel locomotives. The diameter of the boilers and the dimensions of the fireboxes are the same for both classes

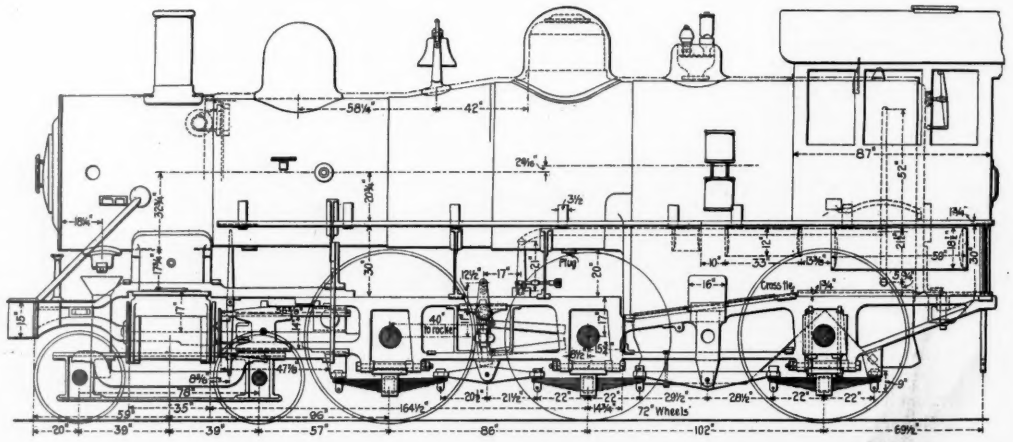
The Baldwin Locomotive Works is now building four of the 10-wheel passenger and six of the mogul freight locomotives, and the Schenectady Works four 10-wheelers and six moguls. The following is a list of the dimensions of both classes and of the special equipment of the engines built at the Baldwin Works:

	Ten-wheel Pass.	Mogul.
Builder's class and number	10.34 D, 326 to 329	8.34 D, 15 to 20
Number	992 to 995	901 to 906
Name of builder	*Baldwin Locomotive Works	
Name of operating road	*Grand Trunk	
Gage	4 ft. 8½ in.	4 ft. 8½ in.
Kind of fuel to be used	*Bituminous coal	
Weight on drivers, lbs.	117,000	120,000
" truck wheels, "	37,500	20,000
" total, "	154,500	140,000
Wheel base, total, of engine	26 ft. 11 in.	24 ft. 1 in.
" driving	15 ft. 8 in.	15 ft. 8 in.
" total, engine and tender	53 ft. 9 in.	50 ft. 11 in.
Length over all, engine	42 ft. 8 in.	39 ft. 10 in.
" total engine and tender	64 ft. 11 in.	62 ft. 1 in.
Height, center of boiler above rail	8 ft. 9½ in.	8 ft. 4½ in.
Height of stack above rail	14 ft. 7½ in.	14 ft. 2¼ in.
Heating surface, firebox, sq. ft.	189	188.1
" tubes, "	2,272	1,803
" total, "	2,461	1,991.1
Grate area	33.43	33.43
Wheels and Journals.		
Diameter of driving wheels	72 in.	62 in.
Truck wheels, dia.	37 in.	37 in.
Journals, driving axle, size	9½ in. × 12 in.	9½ in. × 12 in.
" truck, "	6½ in. × 10½ in.	6½ in. × 10½ in.
Main crank pin	6½ in. × 6 in.	6½ in. × 6 in.
Parallel rod pin	5½ in. × 4 in.	5½ in. × 4 in.
Crosshead pin	4 in. × 3½ in.	4 in. × 3½ in.
Cylinders.		
Cylinder diameter	20 in.	20 in.
Piston stroke	26 in.	26 in.
" rod diam.	3¾ in.	3¾ in.
Main rod, length cen. to cen.	10 ft. 8¼ in.	7 ft. 7¼ in.
Steam ports, length	20 in.	20 in.
" " width	1⅝ in.	1⅝ in.
Exhaust ports, length	20 in.	20 in.
" " width	3 in.	3 in.
Bridge, width	1⅝ in.	1⅝ in.
Valves, kind of	*Balanced.	
" greatest travel	5½ in.	5½ in.
" outside lap	⅞ in.	⅞ in.
" inside lap	0	0
" lead in full gear	1/8 in.	1/8 in.
Boilers.		
Boiler, type of	*Extended wagon top.	
" working steam pressure	200 lbs.	200 lbs.
" material of barrel	*Steel.	
" thickness of material in barrel	21/32	21/32
" diam. of barrel at front sheet	62 in.	62 in.
" seams, kind of, horizontal	*Butt jointed, double covering strips, sextuple riveted	
" " circumferential	*Double riveted.	
Thickness of tube sheets	¾ in. front, ½ in. back.	¾ front ½ back
" crown sheet	⅜ in.	⅜ in.
Crown stayed with	*Radial stays.	
Dome, diam.	31½ in.	31½ in.
Tubes, number	291	291
Tubes, material	*Lap welded iron	
" outside diameter	2 in.	2 in.
" length over tube sheets	15 ft.	11 ft. 11 in.
Firebox, length	120 in.	120 in.
" width	40⅛ in.	40½ in.
" depth	76¾ f. 65 b	73¾ f. 65 b.
" material	*Steel	
" thickness of sheets	Crown, ⅜ in. Tube, ½ in. Sides, ⅜ in. Back, ⅜ in.	Crown, ⅜ in. Tube, ½ in. Sides, ⅜ in. Back, ⅜ in.
" Brick arch	*Yes	
" water space, with fr'nt	4 in.	4 in.
" " " sides	3½ in.	3½ in.
" " " back	4 in.	4 in.
Grate, kind of	*Rocking	
Smokebox, diameter	65½ in.	65½ in.
" length from tube sheet to end	5 ft. 10 in.	5 ft. 10 in.
Other Parts.		
Exhaust nozzle	*Fixed, single	
" " thimbles	5 in., 5¼ in. and 5½ in.	5 in., 5¼ in. and 5½ in.
" " distance of tip above cen. of boiler	6½ in.	6½ in.
Netting	*Wire	
" size of mesh	3½ × 3½	3½ × 3½
Smoke stack (straight), diam.	15¾ in.	15¾ in.
" height above smoke box	37 in.	37 in.
Tender.		
Type	8-wheel	8-wheel
Tank capacity for water	4,500	4,500
Coal capacity	10 tons	10 tons
Kind of material in tank	*Steel	
Thickness of tank sheets	¼ in. and 5/16 in.	¼ in. and 5/16 in.
Type of frame	10 in. channel steel	10 in. channel steel
" " truck	*Arch bar	
Truck	*Rigid center	
Type of truck spring	*Elliptic	
Diam. of truck wheels	43 in.	33 in.
Diam. and length of journals	5 in. × 9 in.	5 in. × 9 in.
Distance between centers of journals	76 in.	76 in.
Diam. of wheel fit on axle	6⅝ in.	6⅝ in.
Diam. of center of axle	5⅝ in.	5⅝ in.
Type of trunk bolster	*Wood plated with iron	
" " transoms	*Channel iron laid flat	
Length of tender frame over bumpers	23 ft.	23 ft.
Length of tank	21 ft. 9 in.	21 ft. 9 in.
Width of tank	9 ft.	9 ft.
Height of tank not including collar	4 ft. 5 in.	4 ft. 5 in.
Height of tank over collar	5 ft. 11 in.	5 ft. 11 in.
Type of drawhead	*M. C. B. coupler	

* These items are the same for both classes of engines.

The axles, the engine truck springs and the bell ringer are made by the Baldwin Locomotive Works. The driving wheel centers are of two kinds; those of the main drivers are of cast steel and those of the front and back pairs are of cast iron. The steel centers are made by the American Steel Casting Co., for the 10-wheel engine and by the Standard Steel Works for the mogul. The cast-iron centers for both engines are made by the Baldwin Works. The driving-wheel tires are all made by the Standard Steel Works. The following fixtures are by the same makers on both engines; sight feed lubricators by the Detroit Lubricating Co.; front and back M. C. B. coupler and driver brakeshoes by the Grand Trunk Railway; safety valve and mufflers by the Coale Muffler & Safety Valve Co.; air pumps, governors and tender brake equipment by the Westinghouse Air-Brake Co. The driver brake equipment is American. The engines have the Houston sanding device, Sterlingworth tender brakebeams, American tender brakeshoes, Crosby steam gages, United States metallic packing and Adams & Westlake headlights. The lagging of the boilers is wood with asbestos paper above and below.





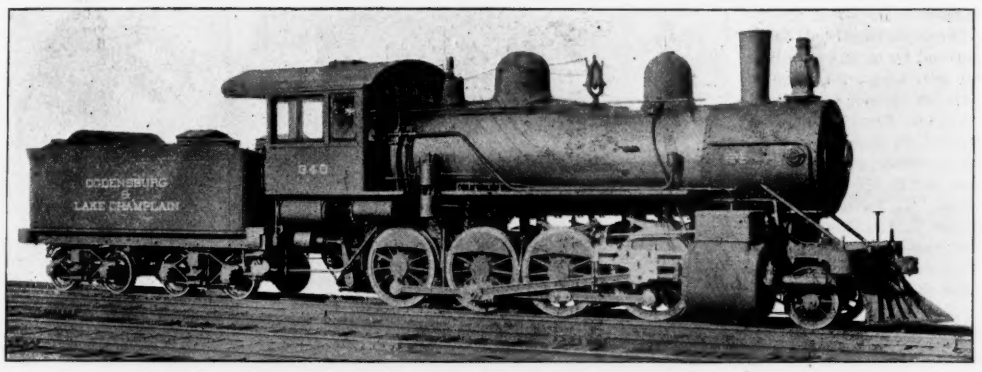
Ten Wheel Passenger Locomotive for the Grand Trunk Railway.

Block Signaling.*

HENRY MILLER (Assistant Superintendent St. Louis, Keokuk & Northwestern): The telegraph and manual systems require operators at each block station, and the cost of operation is relatively so high that they are not likely to be used extensively in the West. In 1895 the St. Louis, Keokuk & Northwestern installed 32 miles of automatic electric block signaling on 16 miles of double track between St. Louis and West Alton. The signals are of the "banjo" type [Hall] placed on an iron post 20 ft. high. They are located about one mile apart, to the right of the track governed by them, about 9 ft. from the rail, and are normally clear. All main-track switches are connected with the signals, so that an open switch will display a danger signal. Indicators at each siding or crossover give notice of an approaching train. Each siding back to the clearing point is included in the circuit, so that a car on a siding not clearing will give a danger signal. At one point a high bridge has been wired, in order that serious damage by fire or casualty will cause the signals in that block to indicate danger. At another place a railway crossing has been connected, so that its use will display danger signals at both sides of it. The rules require that trains finding a block signal at danger shall stop and wait one minute; then proceed under control until the next clear signal is reached, expecting to find a train in the block or an open switch. Signals have stopped trains and prevented possible accidents, as follows: Failure of switches to close properly on account of snow and ice between points, four times; open switches, three times; defective switch, once; broken rails, twice. Trains can make much better time through the block system, no matter how dense the fog or bad the weather. Enginemen can run at speed with safety, relying upon the indication of the signals as against the uncertainty and fear of running into some unprotected train. We have found that, instead of retarding the movement of traffic, it very materially expedites it. During last December, when our business was very heavy and train movements averaged 100 a day, there was but a single failure. The weather conditions were conducive to a very severe test.

* From the discussion at the January meeting of the St. Louis Railway Club.

H. D. JUDSON (Supt. C., B. & Q.): The Burlington about eight years ago, after a very troublesome and costly experience with a heavy traffic, installed on its line for 37 miles west of Chicago the manual block. It consists simply of semaphore blades placed on masts, an average of two miles apart, and operated by a man in a tower. We move over this portion of the road as high as 225 trains a day, or an average of at least 150 a day the year round. The movement of 150 trains means 300 signal movements at each block, 5,700 signal movements every day, or 2,080,500 signal movements a year. Since the installation of the block we have never had an accident for which the block could be held responsible, or one which any block at present in use would have averted. Delays are very infrequent, and if a train ever, during all that time, made a wrong movement, caused by a wrong signal movement, the fact has not come to my knowledge. We do not claim that it is a perfect signal, but we feel pleased with the record we have made with it. Over 2,000,000 signal movements a year intrusted to human hands, without a serious mistake, speaks volumes for the faithful manner in which it has been operated by the signalmen and observed by the enginemen. During the eight years we have used this block we have moved a grand total of considerably over half a million trains. The operation of the block has cost us, approximately, $75,000, or about 14 cents a train, so that we have insured the safe passage of trains over a congested portion of the road for less than one-half a cent a mile.



Compound Consolidation Locomotive for the Ogdensburg & Lake Champlain.

Compound Consolidation Locomotives for the Ogdensburg & Lake Champlain.

The accompanying engraving shows a locomotive recently built by the Schenectady Locomotive Works for the Ogdensburg & Lake Champlain Railroad. The following gives a detailed description of the parts:

CONSOLIDATION COMPOUND LOCOMOTIVE FOR THE OGDENSBURG & LAKE CHAMPLAIN.

General Dimensions.

Gage	4 ft. 8½ in.
Fuel	Bituminous coal
Weight in working order	153,000 lbs.
" on drivers	135,500 lbs.
Wheel base, driving	15 ft.
" " rigid	15 ft.
" " total	22 ft. 10 in.

Cylinders.

Diam. of cylinders	H. P. 22 in., L. P. 34 in.
Stroke of piston	28 in.
Horizontal thickness of piston	5¾ in. and 4¾ in.
Diam. of piston rod	3¾ in.
Kind " " packing	Cast iron rings
" " " rod packing	Jerome metallic
Size of steam ports	H. P. 20 in. × 2½ in., L. P. 23 in. × 2½ in.
" " exhaust "	H. P. 20 in. × 3 in., L. P. 23 in. × 3 in.
" " bridges "	1⅝ in.

Valves.

Kind of slide valves	Allen-American balanced
Greatest travel of slide valves	6½ in.
Outside lap " " "	H. P. 1¼ in.; L. P. 1⅝ in.
Inside clearance " "	⅛ in.
Kind of valve stem packing	Jerome metallic

Wheels, etc.

Diam. of driving wheels outside of tire	54 in.
Mat'l " " centers	Cast steel
Tire held by	Shrinkage
Driving box material	Main, cast steel; balance, steeled cast iron
Diam. and length of driving journals	Main, 8½ in. diam. × 11 in.; balance, 8 in. diam. × 11 in.
" " " main crank pin journals	6½ in. × 6 in.; main side, 7 in. diam. × 5¼ in.
" " " side rod crank pin journals	Intermediate 5¼ in. × 5 in.; F. & B., 5 in. diam. × 3¾ in.
Engine truck, kind	Two wheel, swing bolster
" " journals	6 in. diam. × 11 in.
Diam. of engine truck wheels	30 in.
Kind " " "	Standard cast steel spoke center

Boiler.

Style	Extended wagon top
Outside diam. of first ring	62 in.
Working pressure	200 lbs.
Mat'l of barrel and outside of firebox	Carbon steel
Thickness of plates in barrel and outside of firebox	⅝ in., 11/16 in., 9/16 in. and 7/16 in.
Horizontal seams	Butt joint, sextuple riveted, with welt strip inside and outside
Circumferential seams	Double riveted
Firebox, length	108 13/16 in.
" width	41 in.
" depth	F., 67⅞ in.; B., 64⅛ in.
" material	Carbon steel
" plates, thickness	Sides, 5/16 in.; back, 5/16 in.; crown, ⅜ in.; tube sheet, ½ in.
" water space	Front, 4 in.; sides, 3½ to 4 in.; back, 3½ to 4½ in.
" crown staying	Radial stays, 1⅛ in. diam.
" staybolts	Uister special iron, 1 in. diam.
Tubes, material	Charcoal iron, No. 12 W. G.
" number of	306
" diameter	2 in.
" length over tube sheets	13 ft.
Fire brick, supported on	Water tubes
Heating surface, tubes	2,069.5 sq. ft.
" " water tubes	11.5 sq. ft.
" " firebox	162.1 sq. ft.
" " total	2,243 1 sq. ft.
Grate "	30.8 sq. ft.
" style	Rocking, with drop plate
Ash pan, style	Sectional, with dampers front and back
Exhaust pipes	Single, high
" nozzles	5¼ in., 5½ in. and 5¾ in. diam.
Smokestack, inside diameter	18 in. at top, 16 in. near bottom
" top above rail	14 ft. 1¼ in.
Boiler supplied by	Two injectors, Monitor, No. 10, R. & L.

Tender.

Weight, empty	36,300 lbs.
Wheels, number of	8
" diameter	33 in.
Journals, diameter and length	4½ in. diam. × 8 in.
Wheel base	15 ft. 3 in.
Tender frame	10 in. steel channels
" trucks	4 wheel channel iron, Cen. bearing F. & B., additional side bearings on back truck
Water capacity	4,000 U. S. gals.
Coal "	7½ (2,000 lb.) tons
Total wheel base of engine and tender	49 ft. 11 in.
" length " " " "	59 ft. 5 in.

Engine provided with two 3-in. Crosby safety valves; McIntosh blow-off cock; Westinghouse American brake on all drivers, tender and for train; 9½ in. air pump; magnesia sectional lagging on boiler, dome and cylinders; Leach sand-feeding apparatus; Trojan coupler at front of engine and rear of tender; Kewanee tender brakebeams; one 18 in. headlight, maker "Star"; Ashcroft steam gage.

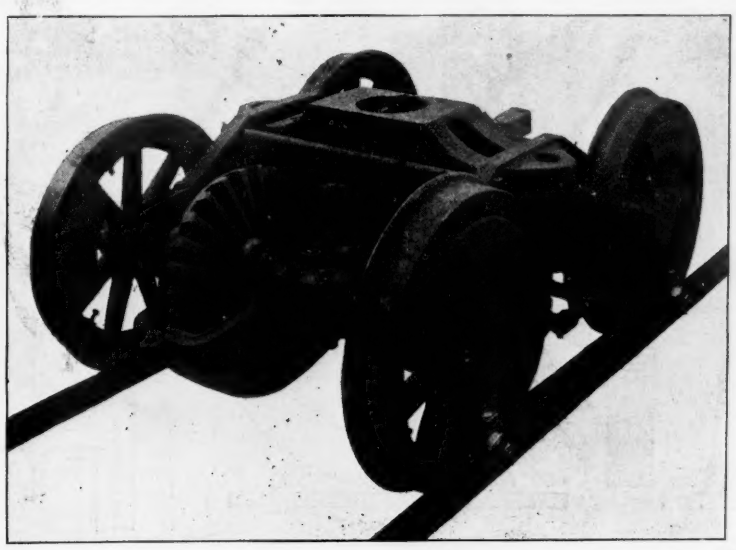
The Heisler Geared Locomotives.

The accompanying engraving shows the improved, all-steel truck of a somewhat novel but not altogether new class of locomotives. Many geared locomotives have been designed and successfully worked for years, but for the most part these have been only for light work, or where heavy grades and sharp curves make it advisable, or even necessary, to utilize the entire weight of the engine or the combined weight of the engine and tender. As the outcome of seven years of experiment and work, there has been designed by Mr. Chas Heisler, of 138 Liberty street, New York, a 60-ton locomotive, to be used on the newly organized McCloud River Railway Co., of Mt. Shasta, Cal. It is now being built by the Stearns Mfg. Co., at Erie, Pa., and will be completed about the middle of March.

Two or four cylinders are used in this central geared class, according to the size of the locomotive. These cylinders are set transversely to the length of the engine just in front of the cab, so that the highest point of the cylinder is at a point about even with the center of the boiler, and are placed at an angle of about 45 deg. with the horizontal in order that the piston may drive the central shaft. By means of universal slip joints and couplings this shaft drives pinion shafts which are geared by bevel pinions to the bevel spur wheels which are on one of the axles of each truck.

All the gears are enclosed in a case in which the parts run in a bath of oil. The frame of this gear case is held in place by a sleeve fastened to the axle, but independent of the truck frame.

The shafts are all under the boiler of the locomotive on the longitudinal center line of the engine and the main shafts are above the axles of the wheels; the pinion shafts (seen in the accompanying engraving) must be inclined somewhat, thus requiring a universal slip joint between the pinion and main shafts. This arrangement has been found to give small resistance when the trucks are rounding a curve.



Truck of Heisler Geared Locomotive, with Gear Case Removed.

For the 60-ton locomotive with three trucks, a bevel gear on the main crank-shaft drives an inclined intermediate shaft leading to the pinion shaft of the third truck, which is designed to be placed under the tender, in order to secure the additional weight on the drivers.

The Heisler locomotives can be remodeled from ordinary locomotives, so that the general arrangement of the parts aside from those already described are in these cases similar to those of ordinary engines.

Tunnel Accidents in Chicago.

On Saturday afternoon, Jan. 29, a large mass of earth fell from the roof of the northwest land tunnel, now under construction at Chicago, and buried two workmen. One of these men was found dead by the rescuing party, while the other was so badly injured that he died on the following day. The same evening the roof again caved in and buried the foreman of a gang of workmen engaged in removing the first lot of fallen material. This man died soon after being taken from the tunnel. A third cave-in was reported Sunday morning in which no one was caught.

On account of the number of accidents which have occurred and the number of workmen injured, it has now become difficult to get men to work in the tunnel. The Commissioner of Public Works has called for written reports of all accidents, and an investigation of the methods used by the contractors will be made Feb. 9, by a coroner's jury; little, however, can be expected to come from such an investigation because of the lack of intelligence of the usual coroner's jury.

During the past two years in which the work on the northwest land tunnel has been in progress it is stated that 10 workmen have been killed, while the sick and injured because of the work number 50. The contractors claim that all possible precautions are taken to protect the men, but much trouble and difference of opinion is known to have arisen in the past between the contractors and the city inspectors. The contractors further claim that the city inspectors are incompetent, and are not capable of passing on this class of construction.

The Nicaragua Canal.

As noted in our last issue, Mr. Alfred Noble lately read a paper before the Western Society of Engineers entitled, "Some Engineering Features of the Nicaragua Canal." Mr. Noble, as most of our readers know, went over the route about two years ago, when a member of the United States Nicaraguan Canal Board and his paper before the Society treated only of the more important engineering features.

It was first stated that there are but two depressions in the north and south range of mountains where canals can be built; one is where the American Isthmus is crossed by the Panama Railroad, the projected route for the Panama Canal, and the other is in Nicaragua. No other practicable route for a canal is known to exist. The northern route offers more advantages to the United States.

The country adjacent to the proposed line was described and shown by numerous maps. The estimated rainfall, and how it can be cared for, was considered at much length. In regard to the conditions, which would affect the health of laborers, it was stated that the northern location presents a decided advantage over the Panama route in this respect, as, lying normal to the prevailing trade winds, it would almost constantly be swept by them; the Panama Canal, being parallel to and shut off from the trade winds, is in an unhealthy region, and the high death rate among the laborers was partly due to this cause.

Central America being subject to earthquake tremors, it had been questioned if large works on the canal could be made to stand, but the best information obtainable goes to show that these disturbances are not to be feared and are quite similar to those common to Southern California.

A difficult question in most canal projects is the water supply for the summit level, but in this case Lake Nicaragua will provide an abundant supply. The proposed dams and controlling works were also discussed, but as little exact data is now at hand it is not possible to form any definite opinions regarding the best location or design of these works.

The Greytown harbor at the Atlantic end of the canal will have to be made by dredging and by jetties and breakwaters. The shifting of the sand along the coast at this point will form a special problem and will have to be provided for.

The total length of the proposed route is approximately 174 miles, which figure is subject to revision after careful surveys are made. Of this distance between 80 and 85 miles will require excavation. The total cubic excavation for the entire work is approximately 102,000,000 cu.

yds., of which 56,000,000 cu. yds. is dredging, 27,000,000 cu. yds. is earth above water, 1,000,000 cu. yds. is mud below water requiring to be pumped, 16,000,000 cu. yds. rock which can be removed above water, 2,000,000 cu. yds. rock which must be removed by subaqueous methods. Other large items are: 10,000,000 cu. yds. of earth embankments, 2,000,000 cu. yds. of rock fill, 2,200,000 cu. yds. stone in breakwaters, 1,000,000 cu. yds. of slope wall, 1,300,000 cu. yds. concrete in locks and sluices.

A large amount of material will be required, in addition, for weirs. Large expenditures will be needed for lock gates and equipment, sluice gates and machinery, weirs for the controlling works, movable dams and other large items.

Mr. Noble concluded with the remark, "The speaker does not doubt that a canal can be built and successfully maintained for any navigation by the Nicaragua route."

Mr. George S. Morrison took an active part in the discussion which followed the reading of the paper. The paper will shortly be published in full with illustrations in the Society Journal.

The Otto and Sintz Gas Engines.

In his first article Professor Reeve referred to a few types of gas engines quite distinct in their design, but which have been running for years, each performing a large variety of work. These included the well-known Otto engine and the Sintz gas and gasoline engines. It is unnecessary to attempt an explanation of its construction or to follow the cycle of the former type, it being familiar to those who have given any careful study to gas engines. The accompanying engraving was taken from a photograph of a 36 H. P. engine made by the Otto Gas Engine Works, of Philadelphia, and represents the most recent design in this type of engines. The valves are all placed in removable castings, so that when the seat of the valve wears out from regrinding, this wear need not affect the working of the engine. The compression of the charge in this type is the same as has been followed heretofore, it being intended to avoid excessive compression in order to avoid extreme strains due to irregular running. For ordinary running complete charges are admitted for a cut-off, but for light work and where extreme regularity is required, as for the generation of electricity, the volume of the charge is varied in accordance with the load on the engine.

The Sintz engines run on a modified Otto cycle commonly known as the Clerk cycle. The gasoline engines of this type, of which the details are shown in the accompanying figures, have been made for the last 12 years by the Sintz Gas Engine Co., of Grand Rapids, Mich. During that time about 2,100 engines have been sent out with an average rated power of 8 H. P. each. No engines larger than 30 H. P. of this type have been made. The details of the working may be followed from the following description, for which we are indebted to the *Engineering News:*

The gasoline reservoir, shown in Fig. 1, has a capacity for about a pint of fuel. The connection of the main tank with this reservoir is made by means of a pipe, shown in the end elevation. A needle valve and dial (shown in the end elevation) controls the outlet from the small reservoir, and regulates the feed to the check valve, which is worked by the up stroke of the piston, it is further compressed and exploded at the beginning of the down stroke. The exhaust port is slightly opened in advance of the transfer port and the exhaust and admission are both controlled by the piston movement alone, the engine proper being valveless. On the downward stroke of the piston the deflector, shown in Fig. 2, directs the incoming gas toward the head of the cylinder behind the exhaust gases, so that the latter are forced toward the exhaust port, which is slightly opened in advance of the transferport.

The governor is of the familiar centrifugal ball form operated by means of a belt and gearing from the crank shaft as shown in the end elevation, Fig. 1. The expansion of the balls raises the governor rod, which in turn works by means of a crank a butterfly valve placed in the gas and air inlet tube. This valve contracts or enlarges as the speed rises or falls from the normal.

In Fig. 2 is shown the point where the electric spark fires the charge The eccentric *C* controls the movement of the rod *D*, Fig. 3. This rod is guided at *F* and carries a projecting metal ring *G*. At *H* is a rod extending into the cylinder and carrying on its inner end at right angles to it the lever *B*, Fig. 2. At the outer end of *H* is a casting *J* containing a clock spring, and a sleeve *K* serves to regulate the tension of the clock spring. The battery wire is attached to this casting. The casting *J* can be partially revolved toward the left, winding up the spring which tends to revolve it to the right, but can do so only to a certain point on account of the block *M*.

In operation the rod *D*, being raised by the eccentric *C*, engages through the projection *G* the steel point *L* and revolves the casting *J* toward the left. This revolution through the rod *H* brings the lever *B* inside the cylinder in contact with the bottom point of the screw *A*. Continuing its upward movement the rod *D* raises the point *L* until finally its slips off the projection *G*. Immediately the tension of the clock spring reverses the direction of the revolution of *J*, and thus breaks the contact between *A* and *B*, producing a spark inside of the cylinder.

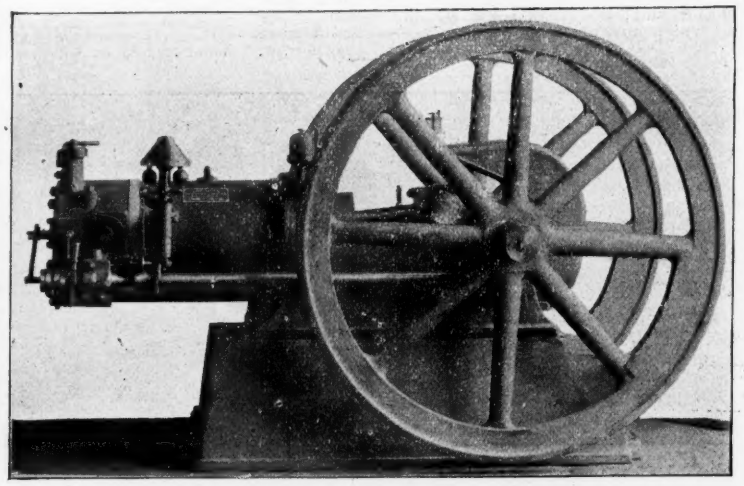
In order to adapt the gasoline engine, as above described, for gas it requires only the addition of the piping and gas bag, as shown dotted in Fig. 1.

Work of the Dickson Air Motor at Wilson Creek Mine.

The Delaware & Hudson Canal Co. has sent us a report of the work done on two routes by the compressed-air locomotive in use at the Wilson Creek mine and illustrated in our issue of Oct. 29, 1897. The engineer's report of the test referred to was made

The following are the lengths and grades of the Phillips heading route: 1,500-ft. grade, 1 ft. per 100 ft. in favor of loaded cars; 1,500 ft. level; 300-ft. grade, 4 in per 100 ft. in favor of loaded cars; 350-ft. grade, 9 in. per 100 ft. in favor of empty cars; 300-ft. grade, 9 in. per 100 ft. in favor of loaded cars; 200 ft. level.

This makes a total of 4,150 ft. one way, and the locomotive pulls from 20 to 30 cars each trip, or 140 cars in nine hours. With 30 cars the total load equals 95.7 of the net load. The empty cars weigh 1,600 lbs. The weight of the coal for each car is 4,780 lbs., and the coal and car weigh net 6,380 lbs.



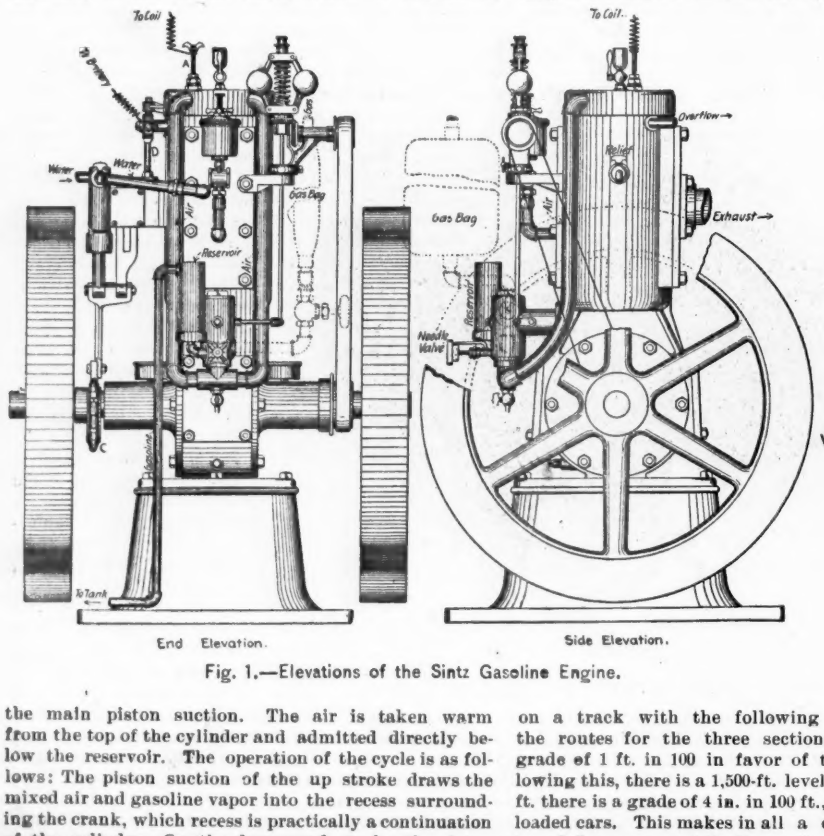
A 36 H. P. Gas Engine, made by the Otto Gas Engine Works, Philadelphia.

Owing to the fact that the compressor for this motor is being run in connection with the plant already installed at the mine, it has not been possible to secure accurate data as to the cost of operation. The working of the motor has been so satisfactory that the company has placed an order with the Dickson Manufacturing Co., of Scranton, Pa., for two more similar to the one now in use.

New Types of Ingersoll-Sergeant Air Compressors.

The extended use of compressed air continually calls for new designs, and the accompanying engravings show two new types that have been received with considerable favor from users of compressed air, although these machines have been on the market but a short time.

The duplex, class "H," steam-driven air compressor, which is a new type introduced by the Ingersoll-Sergeant Drill Co. The frame is of the modified tangye pattern and bolted to a cast iron base common to both engines is shown in the accompanying engraving. The air cylinders are tandem to the steam cylinders and bolted to the same base, thus making a self-contained duplex compressor of a very compact type. The bearings form an integral part of the tangye frame, and are firmly bolted to the bedplate; they are of ample size and babbitted. The crosshead is of cast iron with phosphor bronze shoes arranged for taking up wear. The connecting rods are of forged iron of the marine rod pattern on crank and solid end on crosshead, with bronze boxes. The crank shaft is of the best hammered steel with disk crank at each end. Each



End Elevation. Side Elevation.

Fig. 1.—Elevations of the Sintz Gasoline Engine.

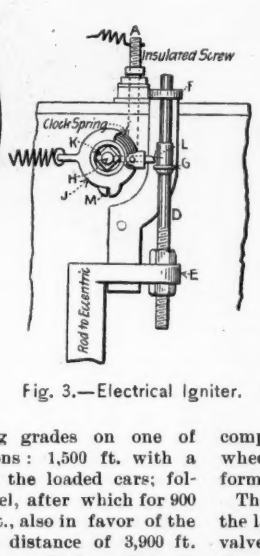


Fig. 3.—Electrical Igniter.

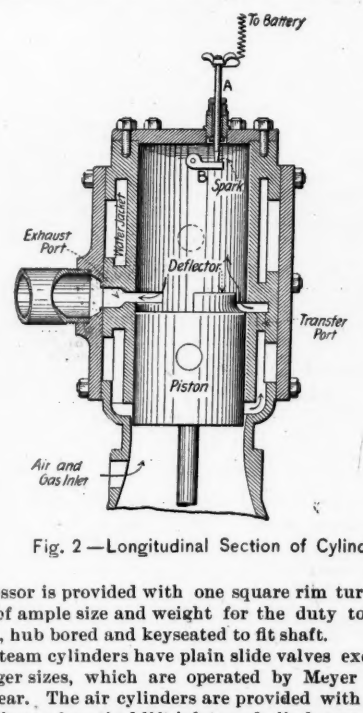


Fig. 2.—Longitudinal Section of Cylinder.

the main piston suction. The air is taken warm from the top of the cylinder and admitted directly below the reservoir. The operation of the cycle is as follows: The piston suction of the up stroke draws the mixed air and gasoline vapor into the recess surrounding the crank, which recess is practically a continuation of the cylinder. On the downward stroke the piston slightly compresses the charge of the explosive mixture which has been drawn into the lower part of the cylinder and forces it into the head of the cylinder, where, by

on a track with the following grades on one of the routes for the three sections: 1,500 ft. with a grade of 1 ft. in 100 in favor of the loaded cars; following this, there is a 1,500-ft. level, after which for 900 ft. there is a grade of 4 in. in 100 ft., also in favor of the loaded cars. This makes in all a distance of 3,900 ft. traveled one way and the locomotive pulls from 25 to 43 cars each trip, the load in each case being 137,15 net tons. Sixteen trips were made in nine hours, hauling in all 400 loaded cars.

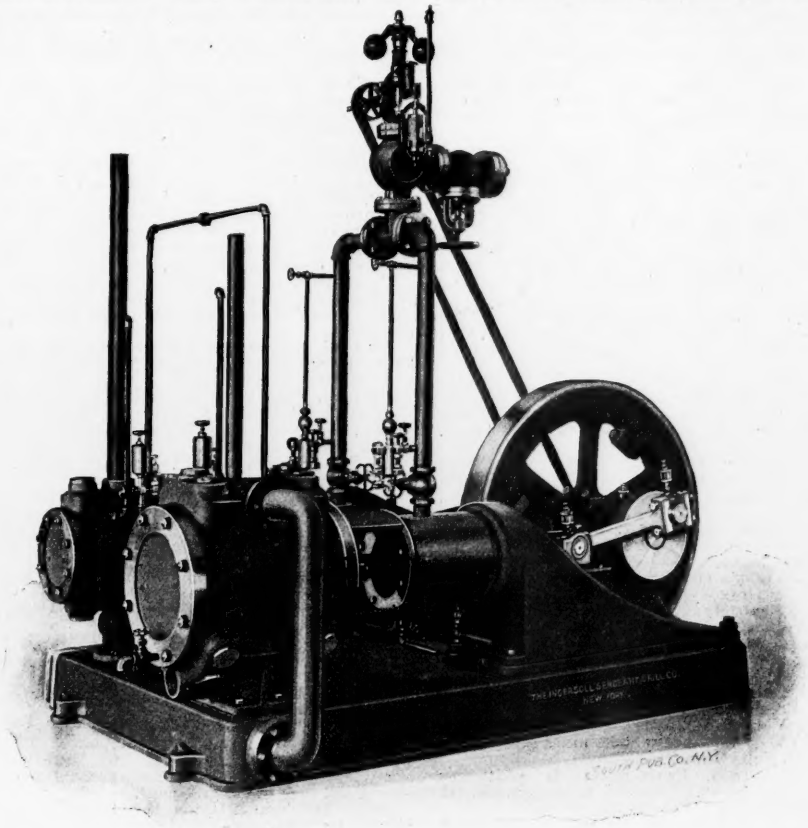
compressor is provided with one square rim turned flywheel of ample size and weight for the duty to be performed, hub bored and keyseated to fit shaft.

The steam cylinders have plain slide valves except in the larger sizes, which are operated by Meyer cut-off valve gear. The air cylinders are provided with a very simple form of vertical lift inlet and discharge valves. The air cylinders and heads are provided with water jackets, and a suitable pipe intercooler is placed in the bedplate and connected to both air cylinders, so that the

air in passing from the low-pressure to the high-pressure air cylinder is thoroughly cooled.

Automatic sight feed lubricators are provided for all cylinders. A very efficient governing device is also provided to regulate the speed and pressure of the machine.

This machine is built in twenty different sizes, em-



The Ingersoll-Sergeant Compound Air Compressor, Class "H."

bracing both the compound and simple type. Sizes of air cylinders range from 6 × 6 in. to 18 × 12 in., with capacities of from 50 to 1,050 ft. of free air per minute, and made in proportions to compress from 10 to 125 lbs. per square inch.

Many railroads have found this compressor well adapted for a large variety of work.

The company has also adopted this type for a belt-driven machine called class "J," in which the flywheel is replaced by a pulley and the air cylinders are attached directly to the frame.

The belted machine is built with the same variations of simple and cross-compound air cylinders, having the same sizes and capacities as the steam-driven machine. The belt machine is adapted for shops and other places where power is already at hand, and connection can best be made to existing countershafts.

Through the liberality of the company a compressor somewhat similar to class "H" has been supplied to Sibley College, Cornell University, on the condition that certain experimental investigations relating to compressing air be undertaken. This machine, which belongs to their triple class of compressor, and is one of the latest and best designs, has already been set on its foundation in the Mechanical Laboratory. Prof. R. C. Carpenter describes the machine as follows:

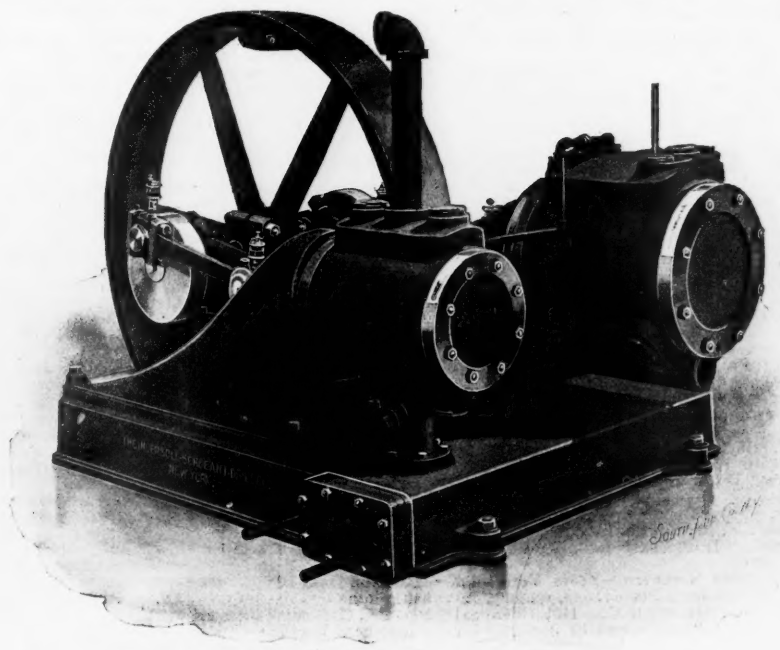
"It is called a triple type air compressor, not because the compression is in three stages, but because there are three cranks. By this arrangement dead points are avoided, and the machine will start promptly in any position; furthermore, the angles between the crank driving the air pistons and those connected to the steam pistons is such that the greatest rotative effect is obtained when the resistance in the air cylinder is at a maximum. This is the very reverse of the conditions existing in the ordinary straight line compressor. The absence of dead points and the nicer adjustment of work to resistance throughout each revolution also make it possible to govern the compressor automatically, making it slow down or even stop as the consumption of air decreases, and to start again when the air pressure falls. There are two steam cylinders each 7 in. diameter by 9 in. stroke; two air compressing cylinders, the low pressure 12¼ in. diameter by 9 in. stroke, the high pressure 7¼ inches diameter by 9 in. stroke. Each air cylinder is provided with a jacket through which running water may be passed to remove the heat of compression; an intercooler is provided, by means of which the air may be cooled in passing from the low-pressure to the high-pressure cylinders. The machine is built to deliver air at 100 lbs. gage pressure; using steam at 120 lbs. pressure, it is to run at 150 revolutions, at which speed it will compress 175 cu. ft. of free air per minute. . . .

"The engines connected with the compressor are of about 40 H. P. and the compressor is of a sufficient size to make investigations on it of great value in practical work, while, on the other hand, it is not so large but that it can be used in regular experimental work in the laboratory."

Railroads Building or Projected in the United States, Canada and Mexico.

As we watch our news columns from week to week we judge that there is a considerable increase in the railroads now building and soon to be undertaken, as compared with the recent past, which, we take it, is important evidence of the improved condition of business and of the greater feeling of security in investments. In the nature of things an accurate comparison cannot possibly be made. No compilation, such as we have made below, can be closely accurate, as so much depends upon the knowledge and judgment of the compiler and his state of mind. His standard in one year or half year may be considerably more exacting than at the preceding period.

In the list which we give below we have tried to select only such enterprises as show considerable evidence of genuineness, either by work actually in progress or by good signs that work will soon be begun. We caution the reader, however, that there are probably included



The Ingersoll-Sergeant Compound Air Compressor, Class "J."

roads which are promising now but which may be slow in fulfillment, and it is not improbable that some of the enterprises mentioned here will fail partially or entirely of completion. Nevertheless, we take it that the list should be found interesting to the student of industrial statistics and important in a business way to contractors, engineers and others.

The names and addresses of officers are not given where the well-known lists furnish such information. The list includes 149 roads in the United States, 8 in Canada and 10 in Mexico; but we have not attempted to sum up the mileage, for, after all, that is quite speculative.

United States

Alabama & Tombigbee.—From Lower Peach Tree, Ala., east 37 miles to Coffeeville. Work in progress. George R. Hannon, Fulton, Ala., General Manager.

Alberene.—From Boiling Springs, Va., to Alberene, 10 miles, including 10 miles of sidings. Pitts & Dowrin, Scottsville, Pa., contractors. R. E. Shaw, Chief Engineer.

Arkansas & Choctaw.—Extension west from Arden, Tex., about 12 miles to the State Line. Work nearly completed. W. H. Carson, Texarkana, Tex., Superintendent.

Arkansas Central.—From Fort Smith, Ark., east 44.5 miles to Paris. Track laid to Central City 13.5 miles. The entire line under contract. Proposed extension from Paris to Little Rock and Hot Springs. N. B. Kendall, Fort Smith, Ark., General Manager.

Astoria & Columbia River.—From Astoria, Ore., along the southern bank of the Columbia River to Goble, on the Northern Pacific, 60.3 miles. Twenty miles of track laid at the west end. T. H. Curtis, Astoria, Ore., Chief Engineer.

Atchison, Topeka & Santa Fe.—Santa Rita extension from San Jose, N. Mex., into the Santa Rita gold-copper district, four miles.

Atlanta & Alabama.—Proposed line from Atlanta, Ga., southwest about 180 miles to Selma, Ala. The Erie Construction Company, of New York, Contractors. R. M. Mitchell, Augusta, Ga., President.

Atlantic Coast Line.—Extension of the Southeastern section from Elrod, N. C., southeast 10.98 miles to Ashpole. Work being done by the company.

Atlantic, Valdosta & Western.—Gap from the Suwannee River east 24 miles to Fort Moniac, Fla., under construction. Geo. S. Baxter & Co., 18 Wall street, New York City, general contractors.

Bayfield Harbor & Great Western.—From Bayfield through Roys Point, about 40 miles. Track laid to Raspberry, 10 miles. J. W. Gorman, Minneapolis, Minn., Contractor. E. C. Hollidge, Bayfield, Wis., Chief Engineer.

Bayfield Transfer Ry.—From Bayfield, Wis., along the Harbor frontage. About eight miles under contract, of which 4.3 miles have been completed.

Beaumont Wharf & Terminal.—Belt line of 8.5 miles around the city of Beaumont, Tex. About one mile completed. W. W. Willson, Beaumont, Tex., Vice-President.

Boise, Nampa & Owyhee.—From Nampa, Idaho, south through Guffey to Silver City and De Lamar. Completed to Guffey, 24 miles. J. M. Clark, Nampa, Idaho, Chief Engineer.

Boyne City & Southeastern.—From Boyne City, Mich., to East Jordan, seven miles. W. H. White, Boyne City, President.

Brainerd & Northern Minnesota.—From terminus at Walker, Minn., northeast about 30 miles to a point on the Great Northern. A. Guthrie & Co., St. Paul, Minn., contractors.

Bruton & Pineora.—From Macon, Ga., to Savannah, 100 miles, projected, of which 28 miles from Bruton to Stillmore completed. A. F. Daley, Wrightsville, Ga., President.

Cairo, Hopkinsville & Cumberland Gap.—Projected from Cairo, Ill., to Cumberland Gap, Ky., about 300 miles. Surveys to be resumed in February. B. A. Neale, Mayfield, Ky., President.

Carolina & Northwestern.—Gap from Newton, N. C., south 10 miles to Hickory. Contract let.

Catskill & Tannersville.—Extension in Greene County, N. Y., to connect with the Otis Elevating Railway, six miles. Charles R. Richardson, 54 Harrison street, New York, President.

Center & Teneha.—From Center, Tex., north 11 miles to Teneha. Grading in progress. Proposed extension of some 22 miles further. S. T. Fleshman, Center, Tex., Superintendent.

Charleston, Clendennin & Sutton.—Extension from Clay Court-House, W. Va., northeast 50 miles to Sutton. Work to begin in the spring.

Chattanooga Southern.—Extension from Gadsden, Ala., south 115 miles to Montgomery. W. S. Hoskins, Chattanooga, Tenn., General Manager.

Cheat Valley.—Projected from Point Marion, Pa., southeast 73 miles up Cheat River to Carson's, W. Va. Completed from Rowlesburg, W. Va., to Whetsell, eight miles. J. J. Stoer, 514 Gerard Building, Philadelphia, Pa., President.

Chesapeake Beach.—From Washington, D. C., east about 33 miles, to Chesapeake Beach. Graded for 10 miles, and the first two miles from Washington completed. Chesapeake Bay Construction Co., Washing-

ton, D. C., builders. Green & Burrows, Washington, contractors.

Chicago, Indiana & Eastern.—Projected from Converse, Ind., southeast 79 miles, to Richmond. From Converse to Fairmount, 18 miles, under contract to Hayworth & Son. H. E. Drew, Fairmount, Ind., General Manager.

Chicago, St. Louis & Texas Air Line.—From Brownsville, Tex., north about 270 miles, to San Antonio. Final surveys completed. Dr. G. Griffin Gunn, San Antonio, Tex., President.

Chilkoot Railroad & Transportation Co.—From Dyea, Alaska, north 15 miles through Chilkoot Pass to Crater Lake; about completed. Three proposed extensions from Crater Lake to Lindeman, around White Forest Rapids on the left bank of the Yukon, and around Five Finger Rapids. Hugh C. Wallace, Tacoma, Wash., President.

Colorado & Northwestern.—From Boulder, Col., northwest 26 miles to Ward. Completed to Sunset, 13 miles. Projected from Sunset southwest to Eldora, and from Ward west over the summit of the mountain range. Orman & Crook, Pueblo, Col., contractors. J. T. Blair, Boulder, Col., General Manager.

Colorado Valley.—Projected from Sweetwater, Tex., southeast about 250 miles toward San Antonio and Austin. Completed from Sweetwater to Ada 7.5 miles. Irving Wheatcroft, Sweetwater, Tex., Vice-President and General Manager.

Columbus, Fulton & Northern.—From Columbus, Miss., north about 130 miles to Nashville, Tenn. Newman Cayce, Columbus, Miss., President.

Corvallis & Eastern.—(Successor to the Oregon Central & Eastern.) Extension from Idahua, Ore., east to Snake River, in Malheur County.

Dakota, Wyoming & Missouri.—From Rapid City, S. Dak., west 33 miles to Mystic. W. T. Coad, Rapid City, President.

Deckerville, Osceola & Northern. From Deckerville, Ark., northeast 33 miles to Osceola. E. M. Ford, Deckerville, Vice-President.

Detroit & Lima Northern.—Extension of the recently acquired Lake Shore branch at Trenton, Mich., to Detroit, about 10 miles. Filling in of gap from St. Johns, O., southeast about 53 miles to Marysville. Completed from St. Johns to Bellefontaine. The Furgerson Contracting Co., 69 Wall street, New York City, has the contract for both extensions. J. R. Megrue, 120 Griswold street, Detroit, Vice-President and General Manager.

Duluth & Iron Range.—From Waldo, Minn., north 18 miles to Colquet River to replace old road. The Drake-Stratton Co., of Pittsburgh, Pa., contractors.

Durham & Charlotte.—From Glendon, N. C., southwest toward Charlotte. Frank D. Jones, Glendon, N. C., President.

East Louisiana.—Proposed extension from Covington, La., north about 36 miles to the State Line. John Poit event, New Orleans, La., President.

El Paso & Northeastern.—From El Paso, Tex., northeast 165 miles to White Oaks, N. Mex. About 30 miles from El Paso graded. George S. Good & Co., of Lock Haven, Pa., contractors. Built by the New Mexico Railway & Coal Co., 66 Broadway, New York City.

Erie & Central New York.—From Cortland, N. Y., east 19 miles to Cincinnatus. Completed to a point above Solon, 10 miles. Projected from Cortland to Deposit, 70 miles. G. F. Mellen Co., 111 Broadway, New York City, contractors. W. D. Tisdale, Cortland, N. Y., President.

Florida, Alabama & Northern.—From Florida, Ala., to Elba, about 30 miles. W. B. Wright, Pensacola, Fla., President.

Florida Western.—Projected from Appalachicola to Carrabelle, Fla., 22 miles. About 10 miles graded. Will lay track this year. R. L. Bennett, Tallahassee, Fla., President.

Fort White & Southern.—From Springfielde, Mine. Fla., to Trenton. Thomas W. Pitts, Fort Whit, Fla., President.

Franklin, Somerset & Kennebec.—From Farmington, Me., south about 40 miles to Tidewater. Grading begun, L. Atwood, Farmington, Me., President.

Galveston, Brazos & Southwestern.—From Galveston, Tex., west about 216 miles to San Antonio. Grading completed from Galveston to Angleton, 42 miles. L. E. Beadle, Galveston, Tex., Chief Engineer.

Georgia Pine.—Under construction from Colquit, Ga., north 19 miles to Arlington, with a proposed extension to Dawson, 28 miles, and another from Bainbridge south to Tallahassee, Fla. Completed to Damascas. R. B. Coleman, Bainbridge, Ga., General Manager.

Gila Valley, Globe & Northern.—From Geronimo, Ariz., northwest 58 miles to Globe. Midland Construction Co., 314 Stimpson Block, Los Angeles, Cal., contractors. Grading to begin by Feb. 15. William Garland, Los Angeles, Cal., President.

Glade Creek & Raleigh.—Extension from Hinton, W. Va., west five miles up Piney Creek. J. L. Lancaster, Crow W. Va., Chief Engineer.

Golden Circle.—From Goldfield, Col., to Victor mine, three miles. Dumphy & Wilcox, Victor, Col., contractors. W. F. Jones, Denver, Col., Auditor.

Great Northern.—Extension of the Fosston Branch from Fosston, Minn., east 220 miles to Duluth. A. Guthrie & Co., of St. Paul, Minn., hold part of the contract.

Guadalupe Valley.—From Galveston, Tex., west about 350 miles. Surveys in progress. C. U. Lott, Victoria, Tex., President.

Gulf & Brazos Valley.—From Henrietta, Tex., south through Mineral Wells to Velasco. Completed to Mineral Wells, 12 miles. W. A. Squires, Henrietta, Tex., President.

Gulf & Interstate.—From Beaumont, Tex., northeast through Alexandria, La., to Vidalia, La., on the Mississippi opposite Natchez. L. P. Featherstone, Galveston, Tex., General Manager.

Gulf, Louisiana & Great Northern.—From Vermilion Bay, La., north to the Arkansas State Line under contract to the St. Louis Construction Co., 1101 Chemical Building, St. Louis, Mo. Work begun in January on section from Alexandria, Mo., to Arcadia, 126 miles. Joseph J. Waitz, Atchison, Kan., President.

Helena & Missouri River.—From Helena, Mont., east 20 miles to the Missouri River. Principal office Helena, Mont.

Hot Springs Terminal.—Terminals at Hot Springs, Ark., five miles. Grading in progress. J. P. Mellard, Hot Springs, Ark., President.

Hutchinson & Southern.—Extension from Medford, Okla., 25 miles to Blockwell. Under contract to W. A. Bradford, Jr. & Co., Hutchinson, Kan., and J. D. Alexander, Wichita, Kan. Projected from Blackwell to a junction with the Atchison, Topeka & Santa Fe, 15 miles.

Jasper Southern.—From Kirbyville, Tex., northwest 20 miles to Jasper. Grading completed. W. W. Blake, Jasper, Tex., Chief Engineer.

Jonesboro, Lake City & Eastern.—From Jonesboro, Ark., east about 46 miles to Osceola. Completed from Nettleton to Lake City, 12.2 miles. Two miles under construction. Preliminary surveys made for the rest. A. J. Kerfoot, Jonesboro, Ark., General Manager.

Kansas & Southeastern.—From Hunnewell southwest through Parker, Okla., 18½ miles, to Kay Center. Section from Hunnewell to Parker under construction. Francis S. Eaton, Kansas City, Mo., one of the Directors.

Kansas City, Osceola & Southern.—From Osceola, Mo., southeast 40 miles to Bolivar being built for the St. Louis & San Francisco. George S. Good & Co., of Lock Haven, Pa., Contractors.

Kansas City, Pittsburgh & Gulf.—The Kansas City & Northern Connecting from Kansas City north 72¾ miles to Pattonsburg, nearly completed. Extension from a point 12 miles south of Redland, I. T., northeast 16.5 miles to Fort Smith, Ark. Bernard Corrigan, Kansas City, Mo., Contractor. Surveys made for an extension from Redland, I. T., to Fort Smith.

Las Vegas, Mora & Taos.—From Las Vegas, N. Mex., northwest 85 miles to Taos. Contracts being made for right of way. F. A. Manzanares, Las Vegas, N. Mex., President.

Laurel & Northwestern.—From Laurel, Miss., northwest 60 miles to Raleigh. Ten miles under contract. M. W. Woodbury, Laurel, Miss., General Manager.

Lehigh & New England.—Pochuck extension from Pochuck, N. Y., to Glenwood, 1½ miles, being built by the company.

Lehigh Valley.—Seneca County extension from Geneva Junction, N. Y., northeast 8.12 miles to Seneca Falls. Completed to Waterloo, 5.12 miles. John F. Dolan, Geneva, N. Y., Contractor.

Little Kanawha.—From Parkersburgh, W. Va., southwest 112 miles to Burnsville. Completed from Parkersburgh to Elizabeth, 26 miles. Under contract Elizabeth to Palestine, 30 miles. C. L. Williams, Parkersburgh, W. Va., President.

Little River Valley.—From Neal Springs, Ark., west 18 miles toward the Arkansas State Line near Cerro Gorda under contract. D. C. Richardson, Horatio, Ark., President.

Long Island.—Great Neck & Port Washington extension from the North Shore terminus northeast 4.25 miles to Port Washington, L. I. W. A. Cattell, 26 Court St., Brooklyn, N. Y., Engineer in charge.

Louisiana & Northwest.—Extension from Homer, La., northwest 36 miles to Magnolia, Ark. Grading nearly completed. Work done by the company. J. T. Beardsley, Gibsland, La., General Manager.

Louisville & Southeastern.—(Successor to the Richmond, Nicholasville & Beattyville). Extension from Irvine, Ky., east 36 miles to Beattyville. Adolph Segal, Philadelphia, President.

Luckiamute Valley & Western.—From Falls City, Ore., to Salem, 23 miles. About three miles graded. H. S. Montgomery, Falls City, President.

Mansfield Short Line.—From Shelby, O., southwest about 20 miles to Lucas. Location surveys made. C. W. French, Mansfield, O., President.

Miami River & Belt.—From Minster, O., through Sidney to Lake View, 40 miles. Surveys in progress T. H. Mathers, Sidney, O., President.

Milwaukee & Superior.—From Sussex, Wis., west nine miles to North Lake about completed. Proposed extension from North Lake to Hustisford, 22 miles.

Missouri & Iowa Southern.—From Sedalia, Mo., north 50 miles to Miami. Sedalia Construction & Equipment Co., builders. A. L. Strang, Sedalia, Mo., Vice-President and General Manager.

Missouri Pacific.—From Little Rock, Ark., west about 165 miles to Greenwood surveyed, but building not yet in progress.

Mississippi River, Hamburg & Western.—From Gaines Landing, Ark., west 46 miles to Hamburg to be completed by April 30. James M. Parker, Hamburg, Ark., General Manager.

Mobile & Ohio.—Extension from Columbus, Miss., southeast 168 miles to Montgomery, Ala., nearly completed. Extension from Tuscaloosa, Ala., to Brookwood, Ala., 19.6 miles. Another extension from the main line to the Blocton branch, 12.4 miles. All under construction or contract.

Mobile, Jackson & Kansas City.—From Mobile, Ala., to Jackson, Miss., 183 miles. Nearly completed to Hattiesburg, Miss., 50 miles.

Montgomery, Hayneville & Camden.—From Montgomery, Ala., southwest 75 miles to Camden. Under construction. A further extension proposed from Camden to the Gulf of Mexico. Sol D. Bloch, Montgomery, Ala., President.

Moore County & Western.—From Concord, N. C., east 37 miles to Craigrownie. Central office, Aberdeen, N. C.

Munising.—Extension from Dickson, Mich., south 16 miles.

Muscogee, Oklahoma & Western.—From Talequah, I. T., to Enid, Okla., about 200 miles surveyed. Building to begin early this year. W. H. Herbert, Cleveland, Okla., I. T., General Manager.

New England.—Norwich & Worcester extension from Allyn's Point south six miles to Groton.

New York & Ottawa.—From Moira, N. Y., north to Canadian line, 15.4 miles, and from International line at Cornwall, Ont., to Ottawa, 58.7 miles. Work on the Canadian side nearly completed. Geo. W. Parker, Cornwall, Ont., President.

New York & Pennsylvania.—Extension from Canisteo, N. Y., northwest about eight miles to Hornellsville. Extension from Oswayo, Pa., northwest 42 miles to Olean, N. Y.

Norfolk & Portsmouth Belt Line.—Belt Line around Norfolk and Portsmouth, Va., 6½ miles. D. F. Keenan, Germantown, Pa., Contractor. Work in progress. Joseph U. Crawford, Norfolk, Va., Chief Engineer.

Norfolk, Virginia Beach & Southern.—Branch from Kempsville, Va., southeast 22 miles to Munden Point, Va. Work in progress.

North Bend & Kettle Creek.—From Lebo Run, Pa., to Black Forest 2½ miles under construction. Proposed extension from Black Forest six miles to Oleona. Work being done by the company. F. A. Blackwell, Gleasonton, Pa., General Manager.

Northern Pacific.—Gaylord & Ruby Valley extension from Gaylord, Mont., south 22 miles to Twin Bridges. Grading completed for 16 miles. Work discontinued for the winter. Cook & Woldson, Helena, Mont., contractors. From Aberdeen, Wash., to Hoquiam, four miles under construction. From terminus near Juliaetta, Ida to Lewiston, 20.6 miles, under construction.

Ohio River & Charleston.—Extension from Gaffney, N. C., to Spartanburgh, 24 miles.

Orange, Call & Pine Belt.—From Orange, Tex., via Call to Jasper, 63 miles. Completed from Salem to Call, 14 miles. Dennis Call, Orange, Tex., President.

Oregon & Texas.—From Silver Springs, Pa., to Camps Corners and Dodge, nine miles. Completed to Oregon Hill, two miles.

Oxford County.—From a point near Woodstock, Me., to a point on the Rumford Falls & Rangeley Lakes, about 25 miles. Location approved by the Maine Board of Commissioners.

Paragould Southeastern.—Extension from Cardwell, Mo., east 10½ miles to Hornersville. Grading completed. J. E. Dougherty, Paragould, Ark., Chief Engineer.

Pecos Valley & Northeastern.—Extension from Roswell, N. Mex., northwest about 220 miles to Panhandle, Tex. J. J. Hagerman, Colorado Springs, Col., President.

Penn Yan & Pennsylvania.—From Penn Yan, N. Y., southwest 33 miles to Savona. Partially graded. J. D. Nares, Corning, N. Y.

Pensacola & Northwestern.—From Pensacola, Fla., to Memphis, Tenn., 440 miles. S. N. Praag, Pensacola, President; J. Rivers Carter, Birmingham, Chief Engineer.

Peoria & St. Louis.—From Pekin, Ill., south 55 miles to Springfield. Dwight L. Wing, 225 South Spring street, Springfield, Ill., General Contractor.

Pickens County.—From Pickens, S. C., east about 12 miles to Easley. Contracts let.

Pittsburgh, Connellsville & Baltimore.—From the Baltimore & Ohio in Fayette County, Pa., to a point on the Pennsylvania, near Fairchance, about 14 miles. R. E. Murdock, Ingraham, Pa., President.

Plant System.—South Western Alabama extension from Newton, Ala., southwest 36 miles to Elba. W. F. Vandiver, Montgomery, Ala., Contractor.

Plymouth County.—From East Weymouth, Mass., southeast about 25 miles to Hanover. Surveys completed. John F. Simmons, Exchange Building, Boston, President.

Portland & Rumford Falls.—Extension of the Otis Falls Branch from Canton, Me., east 10 miles to Chisholm's Mills. Contracts let.

Portland, Vancouver & Yakima.—(Successor to the Vancouver, Klickitat & Yakima.) From Vancouver, Wash., northeast about 160 miles to North Yakima. Of this 15 miles in operation. Surveys for balance in progress. James H. Hubbard, Vancouver, Wash., General Manager.

Quakertown & Eastern.—From Quakertown, Pa., northeast 15 miles to Rieglesville. Grading completed to Springtown, nine miles. H. F. Baker, Quakertown, Pa., Contractor. John Jameson, Quakertown, President.

Queen Ann's.—Extension to Lewes, Del., about completed. Proposed extension from Queenstown, Md., north about 54 miles to Child's Station. Work to begin in the spring.

Randsburg.—From Kramer, Cal., north 29½ miles to Randsburg, completed. Proposed extension from Randsburg north 110 miles to Keeler.

Rice Lake, Dallis & Menomonie.—Extension from Cameron, Wis., to Menomonie.

Richmond, Pittsburgh & Carolina.—From Ridgeway, N. C., north 106 miles to Richmond, Va. Work in progress between Petersburg and Ridgeway, N. C., about 38 miles. Gen. J. S. Negley, 136 Liberty street, New York City, Vice President.

Sabine Terminal & Union Depot Co.—From the terminus of the Kansas City, Pittsburgh & Gulf, at Port Arthur, south nine miles to Sabine Pass. About one mile of track laid. Joseph O. Osgood, Sabine Pass, Tex., President.

St. Louis & San Francisco.—Extension from Sepulpa I. T., west about 108 miles to Guthrie, Okla. Contract let.

St. Louis, Mansfield & Ava Southern.—From Mansfield, Mo., south to Ava. Ozark Construction Company, Springfield, Mo., general contractors.

St. Louis, Perry & Chicago.—From Grafton, Ill., to Macomb, 150 miles, under contract. Moulton & Keene, 102 North Fourth street, St. Louis, Mo., contractors.

St. Louis, Siloam & Southern.—Projected from St. Louis, Mo., southwest about 350 miles to Fort Smith, Ark. H. D. Mackey, Pomona, Mo., President.

St. Louis Southwestern.—The Gray's Point Terminal extension from Delta, Mo., east 16 miles to Gray's Point on the Mississippi River. Work in progress.

San Francisco & San Joaquin Valley.—Extension from Stockton, Cal., west to Point Richmond, opposite San Francisco, now under survey. Extension from the Kern County line south 40 miles to Bakersfield, under contract to Grant Bros., of San Francisco, Cal. W. B. Storey, Jr., 321 Market street, San Francisco, Cal., Chief Engineer and General Superintendent.

San Jacinto, Lake View & Northern.—Extension from San Jacinto, Cal., to Lake View, 10.2 miles. Work in progress. E. C. Proctor, San Jacinto, Contractor. W. C. Nevin, Los Angeles, Cal., President.

Seaboard of Alabama.—Extension from Tiger, Ala., through Chatham 7¼ miles, of which 5¼ miles is completed. J. M. Van Deusen, Fairford, Ala., General Manager.

Shreveport & Red River Valley.—From Shreveport, La., south 43 miles to Coushatta, La. Work in progress. William Ebenborn, Shreveport, La., President.

Sierra (Cal.).—From Oakdale, Cal., northeast 42 miles to Jamestown completed. Projected from Oakdale northeast to Sonora and to Angel's Camp. W. S. Bullock, San Francisco, Cal., General Manager.

Smith's Ferry.—From Lisbon, Pa., to East Liverpool, 30 miles. Work to begin in the spring. J. L. B. Dawson, Beaver Falls, Pa., President.

South Carolina & Georgia.—Extension from Augusta, Ga., southwest about 150 miles to Albany, on the Central of Georgia. New section from Cordele to Albany, 35 miles.

Southern.—Extension of the North Carolina Midland Division from Mocksville, N. C., northeast 28 miles to Mooresville. T. B. Jones & Co., Baltimore, Md., general contractors. About four miles of grading completed.

Southern Pacific.—Extension of the St. Martinsville Branch in Louisiana from St. Martinsville northwest about 24 miles to Arnaudville. R. H. Downey & Bro., Houston, Tex., contractors. Several miles of grading completed. Extension from Montalvo, Cal., to Sugar Factory, 5.4 miles, under construction.

Speedwell Lake.—From the terminus of the Rockway Valley at Watnong Station, N. J., southeast one mile in Morristown. Surveys completed. Richard B. Morriarty, Morristown, President.

Springfield, Little Rock & Gulf.—From Springfield, Mo., south through Little Rock, Ark., to Alexandria, La. J. H. McCarthy, of Little Rock, Ark., has the contract for grading the first three miles from Little Rock south to Dardanelle. P. J. Daugherty, Little Rock, Ark., Chief Engineer.

Stillmore Air Line.—Extension of the main line at Stillmore, Ga., two miles under construction. G. M. Brinson, of Stillmore, Ga., President.

Stockton & Tuolumne.—From Stockton, Cal., east about 35 miles to Summersville. Preliminary surveys made. Work to begin in the spring. Annie Kline Rikert, San Francisco, Cal., President.

Tallahassee Southeastern.—From Tallahassee, Fla., southeast about 150 miles to Gainesville. Reported that work has been begun. James M. Mayo, Ocala, Fla., General Manager.

Tennessee & Cumberland River.—From Bear Spring, Tenn., south 14 miles to Tennessee Ridge. Grading nearly completed. James Coyne, Louisville, Ky., Contractor. J. H. Lory, Bear Spring, Tenn., President.

Tennessee Central.—Extension to Knoxville, Tenn., east about 93 miles. Most of the bonds said to have been subscribed. Jere Baxter, Nashville, Tenn., President.

Tennessee Northern.—From La Follette, Tenn., to Jellico, 24 miles. And from La Follette to Middlesborough, Ky., 31 miles. Completed from La Follette Junction to Warren, 12 miles. Contract let to Callahan & Co., Knoxsville, Tenn., for extension from La Follette toward Careyville. J. R. Sroufe, La Follette, Chief Engineer.

Terminal Railroad Association of St. Louis.—Extension of Belt Line in the city of St. Louis. Grading partially completed. E. P. Bryan, St. Louis, General Manager.

Terminal Railway of Buffalo.—From Blasdell, N. Y., to Depew, 11 miles. Smith & Co., 723 Guarantee Building, Buffalo, contractors. Ten miles of temporary track laid to transport materials. W. J. Wilgus, Grand Central Station, N. Y., Engineer

Texas Central.—From Albany, Tex., to Stanford, 40 miles. Chas. Hamilton, Waco, Tex., General Manager.

Texas State.—Extension, three miles west, making 14 miles in all, from Rush, Tex. Work in progress under direction of James P. Gibson, Assistant Superintendent Rush Penitentiary, Rush, Tex.

Toledo & Northwestern.—From Albion, Mich., north 24 miles to Charlotte. Grading nearly completed. G. E. Murdock, Albion, Mich., President.

Union Railway (Belt Line).—Extension of six miles of main line from Memphis, Tenn., and four miles of spur track. H. L. Brinkley, Memphis, Tenn., President.

Ventura & Ojai Valley.—From Ventura, Cal., north 18 miles to Nordhoff. Grading completed. Grant Bros., San Francisco, Cal., Contractors.

Waco & Sabine Pass.—From Waco, Tex., southeast 61 miles to the Leon County line. Final surveys completed. Further extension proposed to Sabine Pass; in all, 240 miles. R. P. Duncan, Waco, Tex., Vice-President.

Washburn, Bayfield & Iron River.—From Washburn, Wis., west to Iron River, 26 miles, with a branch northeast to Bayfield, 13 miles. Nearly all grading completed. The R. D. Pike Lumber Co., Bayfield, Wis., builders.

Washington County.—From Bangor, Me., along the Atlantic Coast to Calais. Route approved by the Maine Railroad Commissioners. James Crowley, Kansas City, Mo., and P. A. Smith, Baltimore, Md., Contractors. H. J. Englesing, Calais, Me., Treasurer.

Washington, St. Mary's Bay & Point Lookout.—From Washington, D. C., southeast to Point Lookout, Md. Contracts let for first 18 miles. Col. A. B. Linderman, Philadelphia, Pa., President.

Washington, Westminster & Gettysburg.—From Washington, D. C., north about 86 miles to Gettysburg, Pa. Contracts let. James B. Colgrove, Washington, D. C., President.

Wellington & Powellsville.—From Ahoskie, N. C., south 21 miles to Windsor. Most of the grading completed. J. W. Branning, Edenton, N. C., President.

West Virginia Short Line.—From Clarksburg, W. Va., northwest 25 miles to Martinsville on the Ohio River. Surveys completed and work in progress at Clarksburg.

Wiscasset & Quebec.—Extension from Albion, Me., north 10½ miles to Pittsfield nearly completed. Extension from Portland to Monson Junction, 39 miles, surveyed. Extension from Monson north 12 miles to Greenville. Extension from Week's Mills northeast 46 miles to Farmington. W. F. P. Fogg, Wiscasset, Me., General Manager.

Yazoo Delta.—From Yazoo City, Miss., to Dublin, 90 miles. Completed from Moorhead, Miss., to Ruleville. The rest now under construction. C. H. Pond, Moorhead, Miss., President.

Canada.

Atlantic & Lake Superior.—Extension of Baie des Chaleurs Division from Caplin, Que., northeast about 115 miles to Gaspe. Completed to Paspebiac, 20 miles. Under construction to Port Daniel, 23 miles more. Extension from Levis southwest 110 miles to Sorel under construction.

Canadian Pacific.—Crow's Nest Pass extension from Lethbridge, B. C., west 330 miles to Nelson. Grading completed for 110 miles.

Coast Railway of Nova Scotia.—From Yarmouth, N. S., along the Atlantic Coast to Lockport, 97 miles. Completed to East Pubnico, 31 miles, and 20 miles from East Pubnico to Barrington now under construction. H. J. Townsend & Co., of Yarmouth, N. S., contractors.

Irondale, Bancroft & Ottawa.—Extension from Baptiste, Ont., east 10 miles through Herman. Work in progress on first five miles. C. J. Pusey, Irondale, Ont., President and General Manager.

Ontario & Rainy River.—From Port Arthur, Ont., a point on the Canadian Pacific, west about 245 miles to Fort Frances. New subsidy of $120,000 granted.

Ottawa & Gatineau.—From Gracefield, Que., north 24 miles to Maniwaki. H. J. Beemer, Montreal, Que., Contractor. P. W. Ressenway, Ottawa, Ont., General Superintendent.

Pembroke Southern.—From Pembroke, Ont., southeast about 21 miles to Golden Lake. Subsidy of $10,500 for the first 3 5 miles. William Russell, Jr., Pembroke, Ont., Chief Engineer.

Pontiac Pacific Junction.—From Aylmer, Que., northwest nine miles to Hull under construction. H. J. Beemer, Montreal, Que., contractor. From Waltham, Que., to Pembroke, 13 miles. G. C. Dunn, Ottawa, Ont., Acting Chief Engineer.

Mexico.

Chihuahua & Pacific.—From Chihuahua west 124 miles to Guerrero. Edward S. Safford, of Guerrero, Mex., Chief Engineer.

Coahuila & Zacatecas.—From Saltillo southwest about 85 miles to Concepcion del Oro. Grading completed and rails about half laid. McCarthy & Scott, Saltillo, contractors. William Purcell, Saltillo, Mex., President.

Hidalgo & Northeastern.—From Sotoltan northeast 152 miles to Tuxpan. Completed to Tortugas, 7.5 miles. Tomas Mancera, Mexico City, Traffic Manager.

Jalapa Railroad & Power Co.—Concession for land from Jalapa south about 50 miles to Cordova. Completed 10 miles from Jalapa to Coatepec.

Mexican Central.—From Jimenez, Mex., southwest 56 miles to Parral. Grading in progress. H. R. Nickerson, Mexico City, General Manager.

Mexican National.—Extension from Patzcuaro west 54 miles to Uruapan. Grading in progress. W. G. Raoul, 6 Wall street, New York, President.

Mexican Southeastern.—From San Geronomo southeast 264 miles along the Pacific coast to the boundary of Guatemala, with a branch from Tonala northeast to Chiapas River, 131 miles. About 30 miles of grading completed. John D. MacLennan, Cleveland, O., General Manager.

Mexico, Cuernavaca & Pacific.—From Mexico City south to Iguala, 145 miles, with a further extension through Chilpancingo to Acapulco on the Pacific coast, about 317 miles. Fifty-three miles completed. G. A. Stranahan, Mexico City, Construction Engineer.

Michoacan & Pacific.—From Yurecuaro, Mex., southeast 186 miles to Ario. Grading completed for about nine miles. L. R. Gordon, Zitazro, Mex., General Superintendent.

Yuma & Gulf of California.—From San Jorge, on the gulf of California, northwest 61 miles to the Arizona boundary, thence up the Colorado River to Yuma, Ariz., 15 miles, total 76 miles. Contracts to be let about Feb. 20. Capt. Alfonso B. Smith, Los Angeles, Cal., holds the concession from the Mexican government.

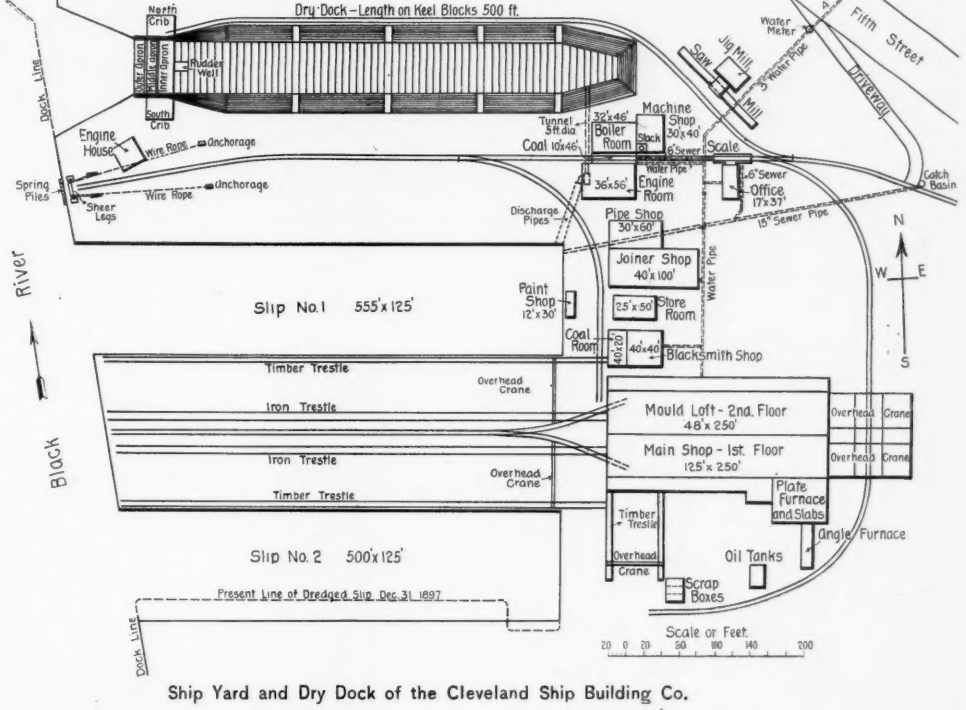
A New Ship Yard on Lake Erie.

The new ship yard and dry dock at Lorain, Ohio, built by the Cleveland Ship Building Company is now in operation. The company began work of construction on Feb. 22, 1897. The plans and specifications were prepared and the construction superintended by Mr. James Ritchie, M. Am. Soc. E., of Cleveland.

The dry dock has a total length of 560 ft., a width on top of 96 ft. clear, width on bottom 59 ft., the dock being the longest on the Great Lakes. The gate is of steel, 60 ft. on the bottom and 66 ft. at the top between the jambs. The depth of water at the ordinary stage (zero on the U. S. gage) is 17 ft. on the sills, 15 ft. 3 in. on the keel blocks and 20 ft. on the floor of the dock. The dock is constructed of timber and piling, and the bottom and sides are filled in with puddled clay. The entrance is formed of two timber cribs supported on piling; the apron between the cribs being filled with concrete. The dock was completed Jan. 23, 1898, and the gate put in place on the following day and tested by pumping the dock out. The result of the test showed practically no leakage, and the time occupied in pumping out was exactly two hours. The pumps used were two Southwark, centrifugal pumps, of 30 in. discharge each, and the amount pumped was approximately 6,000,000 gallons. On Jan. 26, 1898, the steamer Sir William Fairbairn, 438 ft. long and 48 ft. beam, was successfully docked in about two hours.

The ship yard proper consists of two slips 125 ft. wide and about 500 ft. long, parallel to the dry dock, with timber and piling protection. Between the two slips are the foundations and staging for erecting the steel work of new ships, of which two are now under construction. The yard will have a capacity for building four ships at one time. The main shop building is of steel, 250 ft. long and 125 ft. wide on the ground, with a mould loft above, 250 ft. long and 48 ft. wide, for laying out the lines of the ships and preparing patterns.

The accompanying engraving shows the general arrangement of the yard and slips and the location of the dry dock. Black River at this point is 400 ft. wide, and steamers can enter the dry dock and slips with ease, as the river bends in such a way as to lead directly toward the docks.



Ship Yard and Dry Dock of the Cleveland Ship Building Co.

New East River Bridge.

The plans and specifications for the steel towers and end spans of the New East River Bridge to be built between Delancey Slip, New York, and South Fifth street, Brooklyn, have been sent out for bids. The proposals will be received at two o'clock on Monday, Feb. 28, at 49 Chambers street, New York, by Mr. Lewis Nixon, President of the Board of Commissioners. Copies of the specifications and the general drawings of the work, with the proposed form of bid and contract, may be seen, and information will be given, at the office of the Chief Engineer, Mr. L. L. Buck, No. 84 Broadway Brooklyn. Bids will be based upon the whole work to be done, as shown on the drawings and in the specifications. We have selected from these drawings some of the more important details of the structure for reproduction, and from the very minute and clear specifications such portions as are of the most general interest.

There will be two steel towers, including the saddles for the cables, with their fixtures, as shown in the accompanying drawing, of the upper portion of the main tower. Each tower will be made up of eight columns strongly braced laterally in all directions. At about the floor level they will be provided with a system of girders to support the ends of the end span as well as the ends of the suspended structure of the main span of the bridge. At the top of the towers there will also be a system of girders on which will rest the saddles with their friction rollers complete and ready to receive the cables, as shown in the drawings. The end spans will form the portion of the bridge between the tower and anchorages and no part of these spans will be supported by the cables. A steel pier (designated as the intermediate pier) will be placed between the tower and the anchorage on each side of the river.

The copings and dimension stones throughout will be of granite of the best and strongest quality, equal to the best Maine granite, uniform in texture and color and perfectly sound.

The specifications require that all steel shall be acid open-hearth made by a process and from a stock satisfactory to the engineer and made in mills of established reputation. When acid open-hearth steel is made in mills producing other kinds, no material will be accepted for this work unless made especially made for it, and furthermore, the specifications provide that such especially made steel shall be handled by itself or isolated in any manner required by the engineer to prevent the possibility of its being mixed with other kinds of steel.

The chemical requirements of all steel require that the amount of silicon shall be less than one tenth of one per cent. for grades I., II. and III., and less than thirty five-hundredths of one per cent. for grade IV.; of phosphorus less than eight-hundredths of one per cent.; of sulphur less than three-hundredths of one per cent., and of manganese less than five-tenths of one per cent. Steel shall not be melted below from twelve-hundredths to fifteen-hundredths of one per cent. of carbon, nor recarbonized in a careless, uncertain or irregular manner. The manufacturer shall have an analysis of every melt, made by a chemist satisfactory to the engineer.

The steel must be of the following grades: I. Steel for angles, plates and anchor bolts; II. Steel for pins and rollers: III. Steel for rivets; IV. Steel for castings.

All specimens for testing, except rivet specimens, shall be not less than five-tenths of a square inch in section, and shall meet the following requirements respectively:

Grade.	I.	II.	III.	IV.
Maximum ultimate in lbs. per square inch	68,000	.....	56,000	.....
Minimum ultimate in lbs. per square inch	60,000	68,000	47,000	60,000
Minimum elastic limit in lbs. per square inch	33,000	35,000	30,000	.....
Minimum percentage of elongation in 8 in	20%	17%	25%	.....
Minimum percentage of elongation in 2 in	.....	.....	.....	20%

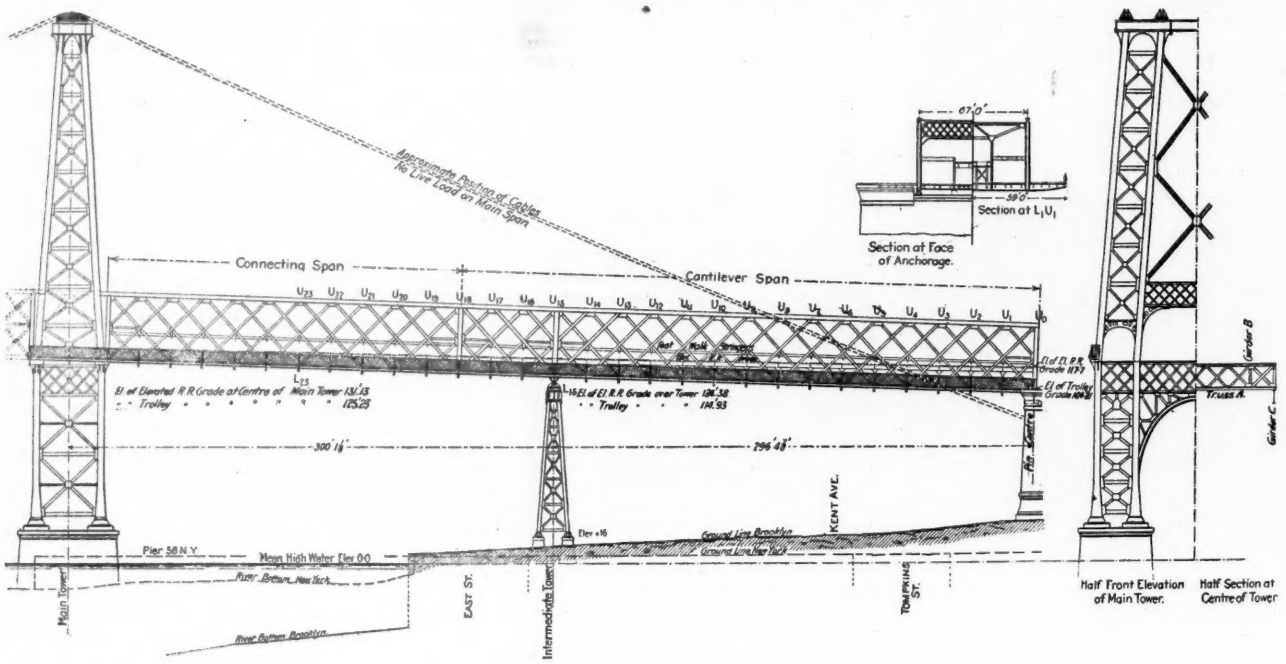
Specimens of Grade I., bent cold 180 deg. about a diameter equal to the thickness of the specimen, shall show no crack on the convex side.

Specimens of Grade II., bent cold 180 deg. about a diameter equal to 1½ times the thickness of the specimen, shall show no crack on the convex side.

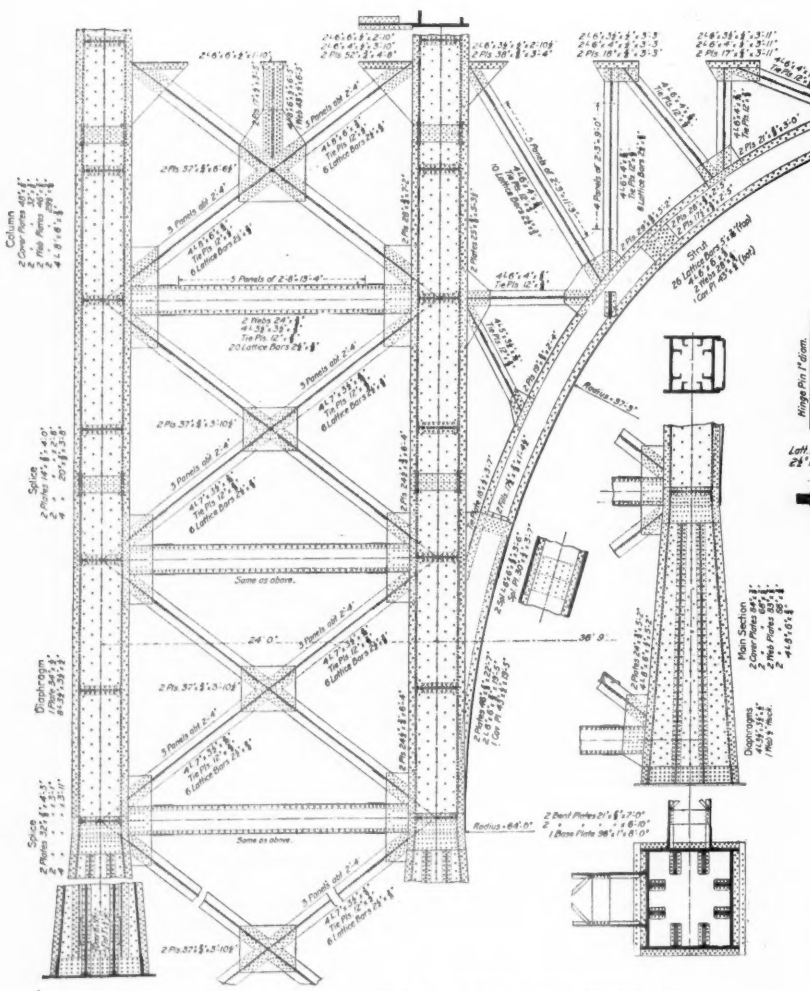
Specimens of grade III., bent to closing, shall not crack.

All ingots for plates, angles and other shapes shall be bottom cast. All shapes shall be rolled from billets,

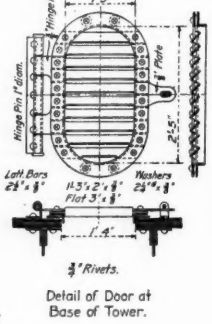
(*Continued on page* 102.)



Elevation of Approach—New East River Bridge.

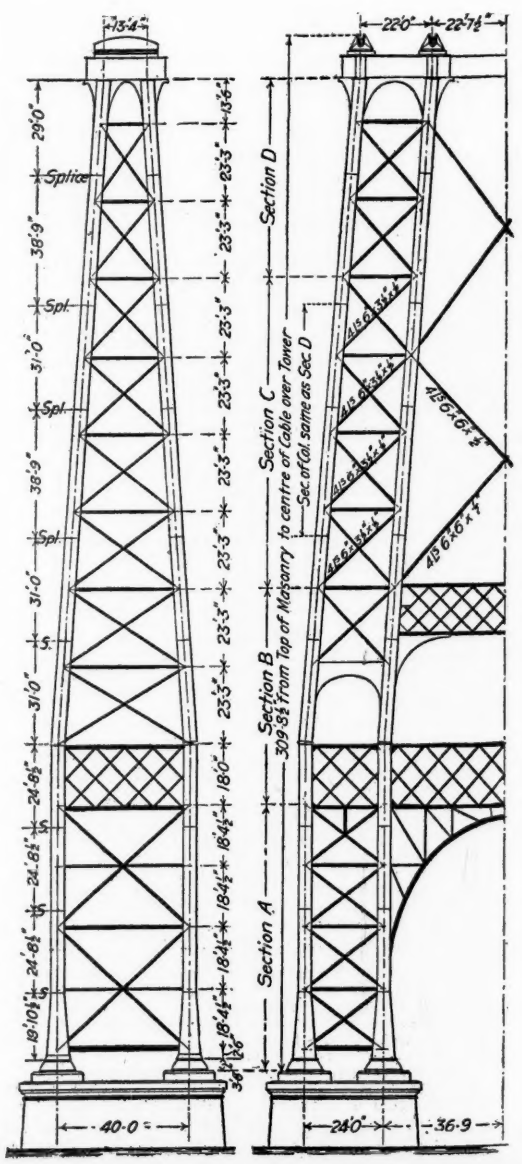


Cross Section of End Spans.

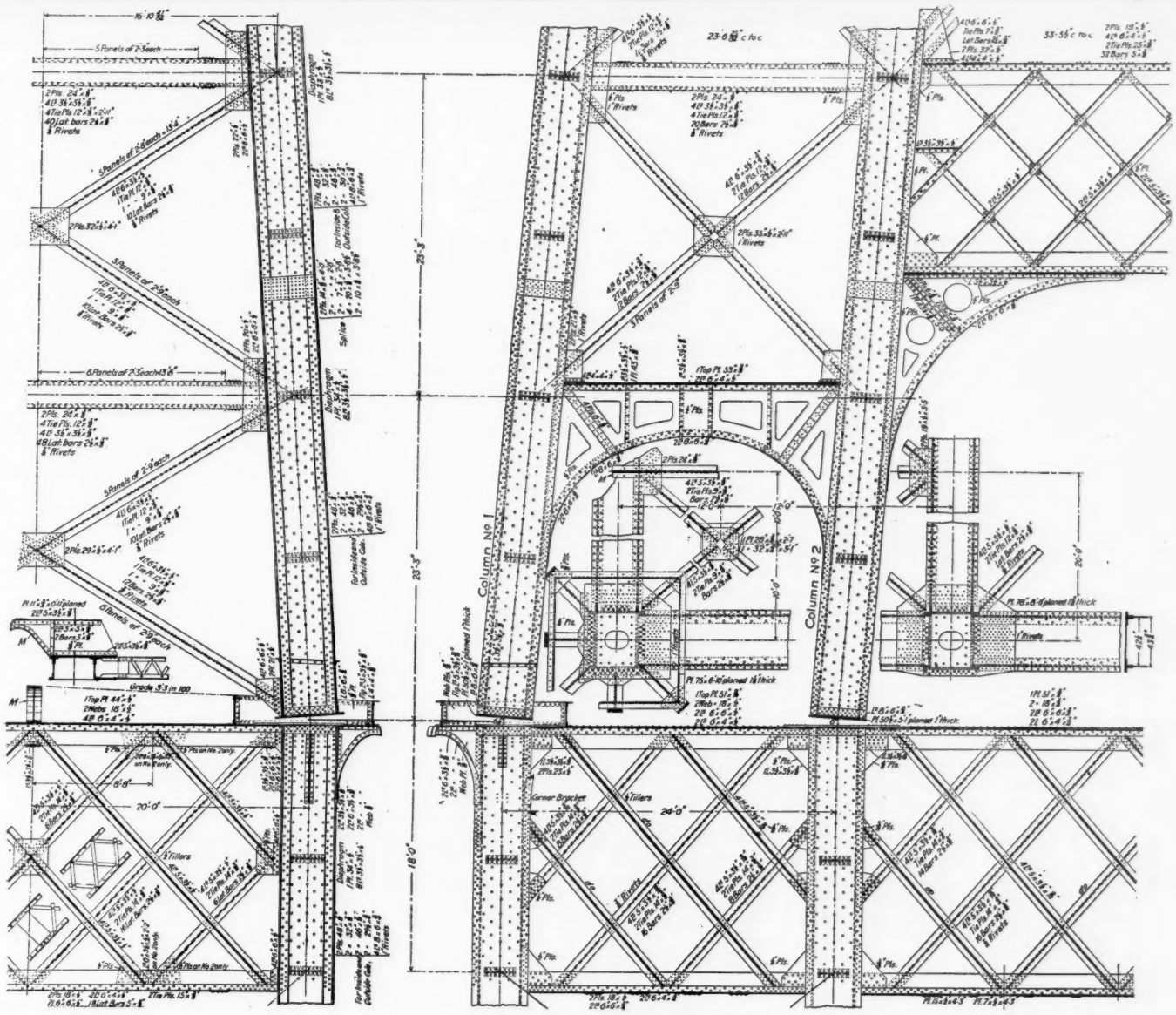


Detail of Door at Base of Tower.

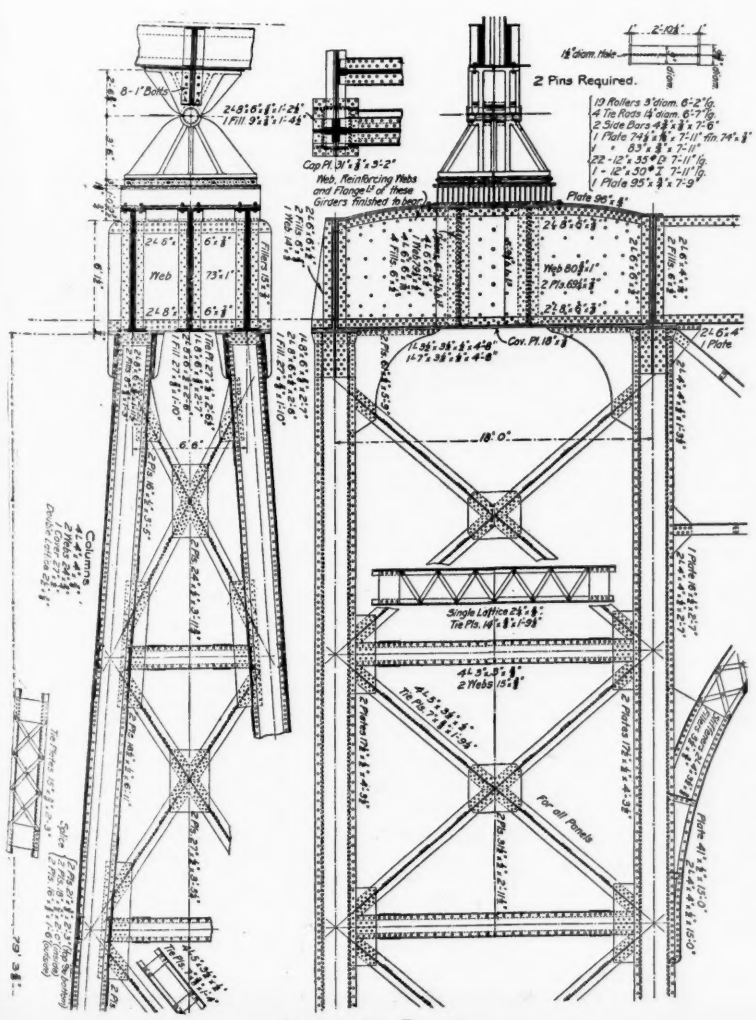
Details of Main Tower, Section A.



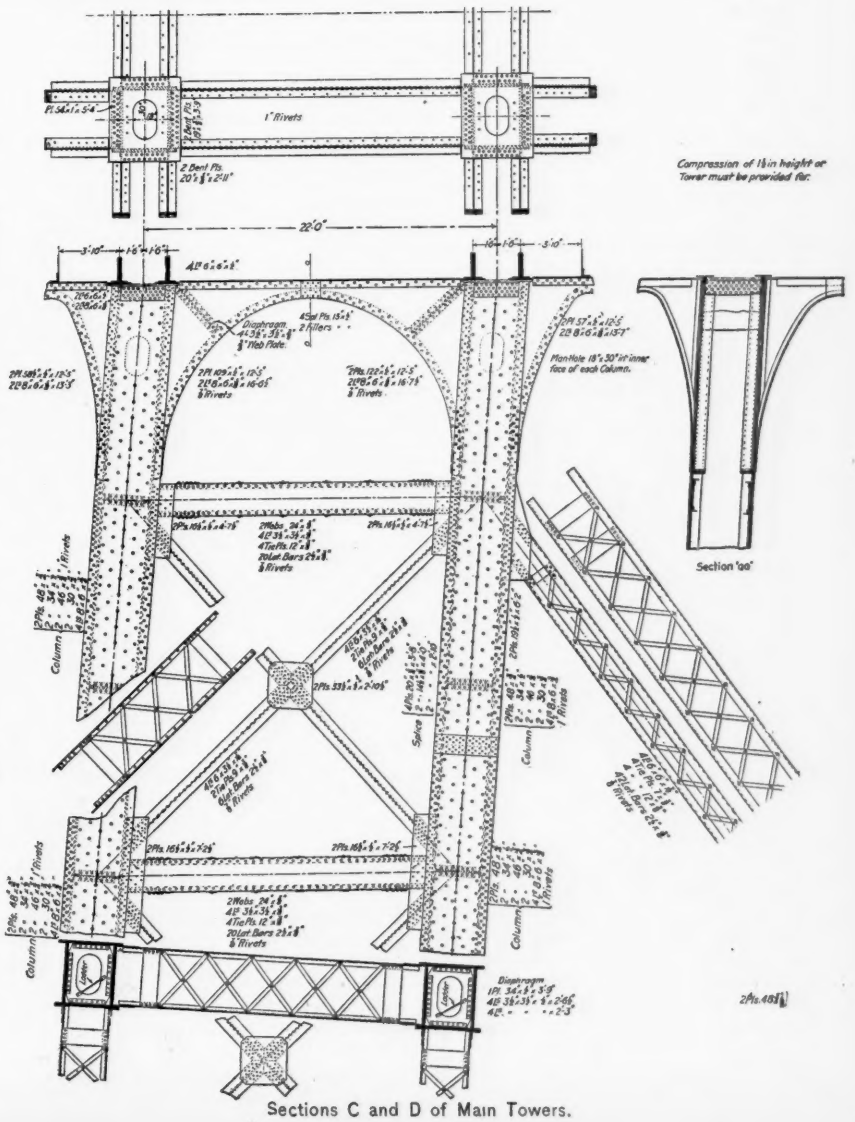
Elevations of Main Towers.



Section B of Main Towers—New East River Bridge.



Intermediare Towers.



Sections C and D of Main Towers.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
Published Every Friday,
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

"The two famous underground railroads of London, known as the 'Metropolitan' and the 'District,' are about to banish the steam locomotive altogether. It has been decided to use electric traction. Apart from the vitiated atmosphere there was nothing to complain of in these railroads. The service was prompt and frequent and on account of the side doors, one at each pair of seats, discharging directly on to the platform, trains were emptied more rapidly and stops were briefer than on our own elevated lines, where the passengers have only two means of exit from the car."

The above is from the *Scientific American* of Feb. 5. We know that it contains some misinformation, and we fear that it is all misinformation. First, we doubt very much if "it has been decided to use electric traction." We know that there is a strong pressure in that direction and that there has been a good deal of talk and discussion looking toward electricity and that the recent government inquiry into the ventilation of the "underground" has greatly stimulated investigation into the policy of fitting those lines for electric working. We have not learned, however, that any decision to change the motive power has been reached. It is not true that owing to the side doors the stops are briefer than on our own elevated roads. The writer of these lines has timed many stops on the London underground roads, both the Metropolitan and the Metropolitan District, and many on the elevated railroads of New York. He found that the average length of stop on the London roads was 30 seconds; on the elevated roads of New York it was somewhere between 12 and 15 seconds. There are certain pretty good reasons why these things should be so, notwithstanding the side doors of the London rolling stock. The reader who is curious to know what some of these reasons are may consult the *Railroad Gazette* of 1894, page 388. In fact he will find in that year's volume four editorial articles which will probably give him more accurate comparison of conditions as to speed and frequency of trains, frequency of stations, traffic handled, and earnings resulting, than he will find collected anywhere else in the English language. We may add that at the stations where trains pass most frequently on the London system and on the New York system twice as many trains pass in a unit of time on the Manhattan as on the London underground.

The great snowstorm of Feb. 1, which seems to have been worse in Boston and vicinity than anywhere else, calls attention once more to the desirability of better telegraph lines, and more than one railroad telegraph superintendent has taken this occasion to present a requisition for underground wires, or, at least, to advise his general manager that an appropriation for that purpose ought to be made. It goes without saying—at least among passenger department officers and stationmen and trainmen, of roads that have had experience in this matter—that a railroad needs a never-failing telegraph line simply to enable it to properly accommodate the public when all trains are badly delayed. People have become so habituated to receiving prompt and full information that to put them off with a "don't know" is not so readily excusable as it was before the days of universal telephones. But most railroads have a more pressing necessity than this. A rear collision of passenger trains occurred on a crowded railroad near Boston, and, according to the newspapers, it was due to the failure of automatic block signals in consequence of the storm. Presumably, a correct version would be to the effect that the engineman failed to exercise the caution that he should have exercised, knowing the signals were not working; but this does not alter the lesson that prevention is better than cure; that if the fixtures and facilities had been such as to withstand the storm the engineman would not have had the opportunity to make a costly blunder. Again, the roads that did not have collisions suffered great inconvenience from the lack of wires, aside from their inability to properly post passengers concerning the whereabouts of trains. Whatever the use that a wire is to be put to, whether reporting trains for passengers, or making meeting points for trains on single track, or working a distant signal, the first condition to be considered, from the present point of view, is permaneney, and we are curious to know whether the use of insulated wires, laid underground, is the only possible remedy for the trouble. In all previous storms the experience has been that well-built lines, on short poles, not loaded down with too many wires, stood any amount of snow, sleet and wind. In the great storm of 1888 the one new line between New York and Boston stood the strain. Can it be that all the lines of poles leading to Boston, telephone and all, that were standing two weeks ago, were old or too heavily loaded? This is an interesting question, for underground lines are, in many situations, too costly to be adopted if there is a cheaper method available.

The question of never-failing electrical connections from station to station has to do with automatic block-signal failures, whatever the reason why the signals are not available. With simple rail circuits and thoroughly insulated and protected connections from rails to posts, such signals may be worked with very little wire-line, either above or below the surface of the ground, and snowstorms may thus be defied; but it is highly desirable that the old-fashioned telegraph line, or its equivalent, be at all times available, for use in case of failure of signals from any cause. This need arises from the fact that once trainmen have become habituated to the use of the space interval it is dangerous to return to the time-interval practice. This is the conclusion that has been reached by American managers who have carefully looked into the matter, and the experience of the English roads confirms it. It has taken many years to educate flagmen to flag, but it does not take long for them to learn not to flag when block signals are in use. When an automatic signal must be taken out of service the safe method of protecting trains is to at once substitute the telegraph block system; to have station telegraph operators maintain space intervals between trains. The other plan—of notifying enginemen to fall back on the time-interval rules, and brakemen to protect by flag—involves elements of uncertainty which always have been bad enough, but which, with the increasing use of block signals, are constantly growing more uncertain. Only a few weeks ago we recorded a collision due to an engineman's taking chances with an automatic signal which had been out of service for a day or two.

East Indian Railroads.

The construction of railroads in British India has gone on at a pretty regular rate from year to year since 1883, and much more rapidly than before that time. Beginning in 1853, there were less than a thousand miles in 1860, about 2,200 in 1862, 4,000 in 1868, 8,200 in 1878, and 10,500 in 1883. At the close of the fiscal year last reported, March 31, 1897, there were 20,391 miles open, showing an average increase of 760 miles per year since 1883. In the last fiscal year 714 miles were opened, and the mileage now is nearly the same as that of the United Kingdom. British India, however, has 1,866,000 square miles of area and 291,000,000 inhabitants; Great Britain only 121,500 square miles and 38,000,000 inhabitants, so that the two territories as fields for traffic are very unlike.

The Indian railroads vary greatly in construction and in administration. Of the entire length open last year no less than 8,365 miles were of the meter gage and 829 miles of still narrower gages, six lines with 210 miles of 2 ft. 6 in. and 79 miles of 2 ft. gage. A little more than one-half of the total mileage is owned and worked by companies with which the state has no proprietary relations; about one-fourth is owned and worked directly by the state; about one-eighth is worked by guaranteed companies; 428 miles by "assisted companies." Then the native states (which occupy nearly half of the area of India) own and work nearly 900 miles, own about as much more which is worked by companies, and own 146 miles more which is worked by an agency of the state railroads. Moreover, there are 59 miles of "foreign lines" in India, France and Portugal still having dominion over minute portions of India in the midst of the British dominions, relics of greater areas and much greater claims in the last century.

Thus statements of "average" cost, earnings, traffic, etc., for the Indian railroads have little significance, the more so as some of the lines in the northwest have been built primarily for strategic reasons.

Another difficulty is in the currency. Silver is the currency of India, and there is perhaps no other country in the world where prices are to so great an extent fixed by custom, and follow so slowly a depreciation or appreciation of the currency. Exports and imports have their prices fixed or limited by the outside world, but the exports and imports of India, large as they may be in the aggregate, are a drop in the bucket compared with the home production and consumption of its vast population. Now the Indian railroads, of course, receive their earnings in Indian currency and pay for wages and Indian supplies in the same; but for supplies imported from Europe and for interest on the capital invested in them (substantially the whole of which was supplied from England) they must pay in sterling. This makes a complication which renders any reduction of rupees into our currency imperfect, except, perhaps, for cost of construction of the chief part of the system, opened before the depreciation of silver.

Taking the value of the rupee at 44 cents, as it was when most of the Indian railroads were built, the average cost per mile of the Indian railroads has been $69,948 for the standard gage, $31,295 for the meter gage, and $14,746 for the narrower gages. The earlier railroads followed closely English practice and were excessively costly; but the Indian authorities have learned to adapt their construction more closely to the circumstances, so that the later lines of standard gage have been much cheaper than the above average.

The average earnings per mile in the year reported (which was an unfavorable one) were 12,842 rupees. This would have been equivalent to $5,651 in the old days; but at the average rate of exchange actually existing in the year it was equal only to $3,532. Neither of these figures fairly gives the value of the rupee earnings for reasons given above. The proportion of supplies imported may be inferred from the fact that the *state* railroads paid nearly $5,500,000 for supplies in England, and less than $250,000 for supplies in India—fuel not included. Only 106,509 tons of English coal were consumed in 1896, against 1,174,039 of Indian coal and 321,052 *tons* of wood.

About three-fifths of the earnings were from freight.

The working expenses were 48 per cent. of the earnings, leaving net earnings at the rate of 6,678 rupees per mile, which was $2,938 at the old value of the rupee, and $1,836 at the current rate of exchange. The latter is 3¼ per cent. on the capital invested and 10 per cent. less than in the previous year.

Most of the capital for the Indian railroads until recently was borrowed at five per cent., or five per cent. was guaranteed on the shares. The government can now borrow at little more than 2½ per cent. The depreciation of the currency is felt most perhaps on lines which, formerly guaranteed, have been taken over by the state under contracts which permitted it to do so when the profits had passed a certain point. The chief of these lines was left to be worked by the company which had owned it, on a contract which divided all profits above five per cent. equally between the state and the company. A clause in this contract specifies that the company's share of these profits shall be remitted at the rate of exchange of 22 pence per rupee. "The state has to continue to pay interest at the guaranteed rates until contracts terminate, and it is consequently unable to obtain any advantage from cheaper money and the improved credit of the country; that is to say, where the state could now raise money at a little over 2½ per cent. to pay off loans raised at higher rates of interest, it has to continue paying interest at a high average rate of about 4¾ per cent. on the capital raised by the guaranteed companies, and, owing to the fall in exchange, the sterling interest charges, if converted into rupees at the average rate for 1895-96, gives a percentage of about 7⅝ on the total capital raised converted at the contract rate of exchange."

We have heretofore noted that the Indian railroads

furnish an example of the cheapest railroad working. The averages of the 11 principal standard-gage lines, which together work 10,758 miles, and more than half of the whole Indian system, were a little less than 2 rupees per train mile, 55 cents at the current rate of exchange and 88 at 44 cents per rupee. And the train loads are the largest for passengers and among the largest for freight trains known in the world, averaging for these 11 roads 225 passengers and 165 tons of freight. The East Coast Railway, which has 500 miles of road, had an average passenger train load of 316. The average in this country is given as 38 in the Interstate Commerce report for 1895.

The most profitable of the Indian railroads is the East Indian, which has 1,701 miles of road, 474 of it double-track road, which has cost at the rate of $96,500 per mile. It had a traffic in the year reported equivalent to 900 passengers and 1,273 tons of freight each way daily over its whole mileage. We have many railroads with a heavier freight traffic (Pennsylvania Railroad, 3,826; Pittsburgh & Lake Erie, 4,530; Lake Shore, 2,146; Norfolk & Western, 1,200), but the densest passenger traffic we can find is 750 each way daily on the Boston & Albany, 699 on the New York, New Haven & Hartford, 507 on the Long Island, 391 on the New York Central and 343 on the Pennsylvania.

The East Indian's gross earnings were comparatively moderate, 31,044 rupees per mile, which could have been exchanged for $8,290, but it was worked at the astonishingly low rate of 32 per cent. of its earnings, leaving $5,637 of net earnings. Its working expenses per train mile were only 1.52 rupees, which, even at the old value of that currency, would be only 67 cents; and the average train loads were 253 passengers and 225 tons of freight. The reported *cost* is 0.108 cent per passenger mile and 0.224 cent per ton mile, reckoning the rupee at the old value of 44 cents and three eighths less at the current rate of exchange! In comparison with these figures, ours, which for freight are much lower than in any European country, are enormous.

The average receipt on the East Indian, still taking the rupee as 44 cents, was 0.417 cent per passenger mile and 0.667 cent. per ton mile. This passenger rate is approached nowhere out of India. The freight rate, however, is higher than the average on many of our railroads, and about equal to the average of Groups II., III. and IV. of our Interstate Commerce Report; that is, on the 54,000 miles of road west of New England and the Atlantic coast, as far as Georgia and East of Illinois. The *profit* per ton per mile on the East Indian, 0.443 cent, was at least one-half more than the average in this country. These rates, it must be remembered, are on the most prosperous Indian line; but there is only one of the 11 "principal" standard-gage lines which has a higher average passenger rate, and most of them have a lower one, the Bengal-Nagpur (861 miles) and the East Coast (503 miles) receiving 0.32 cent. per passenger mile. All but one, however, have higher average freight rates, and generally much higher, the average of the 11 being 0.82 cent. The lowest freight rate on the East Coast Railway is 0.462 cent. But the lines with lower passenger rates report a much higher expense per passenger mile, and no other Indian line has nearly so low an expense per ton mile as the East Indian, which thus still can claim to hold the world's record for cheap working. Favoring circumstances, besides the large train loads, are long hauls, an average of 65 miles per passenger journey and 209 per freight shipment (average in this country 24 miles and 122 miles).

Doubtless, however, the chief reason for the low expenses is very low wages. What these are the report does not show. It does show, however, that the number of employees in proportion to mileage and to work done is much greater than here. On the 19,855 miles open at the end of 1896, 283,095 men were employed, or an average of 14¼ per mile, and 1 for every 22,700 passenger miles and every 17,770 ton miles. Here, in 1895, there were 4.4 employees per mile of railroad, 1 for every 15,550 passenger miles and for every 108,700 ton miles; so that if we make a passenger mile equal to a ton mile (which would not be far out in India), the American railroad man effects more than three times as much as the Indian. Indian is the proper designation, for only 1⅛ per cent. of the employees of the Indian railroads are Europeans. But while we cannot say just what the wages of Indian railroad men are, we can learn from the report that they were not high. On the East Indian Railway the total working expenses were at the rate of 362 rupees per man employed, and even at 44 cents per rupee this is but $160 per year. Whether we take off one-fourth, one-third, or one-half of this for the cost of supplies, the remainder will be but a fraction of the lowest rate of wages here.

Train Accidents in 1897.

The record of train accidents in the United States in 1897 makes a tolerably favorable showing as compared with preceding years; but, as in the case of the records of traffic and train mileage, the value of the comparison is somewhat impaired by the great increase in the last two or three months in the year. In November and December accidents were twice as numerous as in the same months of 1896, yet most of the earlier months showed records about on a par with those of the years immediately preceding. In some respects the earlier part of the 1897 record was very favorable. The number of fatal accidents to employees in train accidents for the year is less than in any recent year; and in the month of May the number of employees reported *injured* was only about one-fourth the average monthly number appearing in that column. We have spoken of the record as a whole as a favorable one because the serious injuries to passengers and employees seem not to have increased as fast as train mileage has. Non-fatal injuries are fewer than in any recent year except two of the dullest, and in fatal injuries 1897 is as low as the lowest.

The record of passengers killed remained low for the first eight months of the year, but in September there were two bad collisions (Newcastle, Colo., and Emporia, Kan.), and the record of persons killed for the month rose to 72; 16 passengers, 39 employees and 17 other persons. In October came the Garrison disaster, and the month showed totals of 24 passengers, 25 employees and five other persons killed. The record of passengers killed in November has now been diminished by three, the report of three fatally injured at Coal Bluff, Ind., having been erroneous. In spite of the September and October records, the total for the year, 62, is less than one-half of that for 1896 (128), the earlier year having included three very bad disasters—Logan, Ia., Atlantic City, N. J., and Gurnee, Ala.

TABLE NO. 1—TRAIN ACCIDENTS—THEIR NATURE AND CAUSES, FOR TWENTY-FIVE YEARS.

	1897.	1896.	1895.	1894.	1893.	1892.	1891.	1890.	1889.	1888.	1883-87.†	1878-82.†	1873-77.†
TRAIN MILEAGE in United States in millions of train miles*	900	850.7	834.2	818.4	889.4	864.9	831.2	793 9	722.0	688.8	.....	.....	.....
COLLISIONS:													
Rear	355	228	301	280	455	485	555	495	379	404	342	275	150
Butting	158	129	109	134	223	251	284	323	260	311	174	121	96
Crossing and miscellaneous	218	157	192	199	318	326	298	223	110	89	32	21	44
Total collisions	731	514	602	613	996	1,062	1,137	1,041	749	804	548	417	295
DERAILMENTS:													
Broken rail	25	26	41	32	71	63	53	38	32	61	68	48	71
Loose or spread rail	23	16	16	35	57	53	68	44	28	42	66	34	31
Broken bridge or trestle	26	19	16	23	20	30	42	38	42	40	32	27	24
Broken or defective switch	13	9	9	16	41	26	38	33	10	29	13	3	9
Broken or defective frog	8	3	5	5	16	11	11	12	7	16	11	2	5
Other defects of road	6	5	8	3	9	8	2	2	1	1	1	2	9
Total defects of road	101	78	95	114	214	191	214	167	120	189	191	116	149
Broken wheel	42	42	33	33	48	46	39	37	28	48	33	28	22
Broken axle	77	74	70	71	88	56	66	59	48	44	49	36	32
Broken truck	30	24	20	18	31	28	38	25	20	27	15	11	10
Failure of coupling or drawbar	28	16	17	27	29	27	20	7	5	7	4	1	4
Fall of brakebeam	14	9	14	10	19	23	27	12	9	9	5	.....	3
Other defects of equipment	23	33	23	23	26	26	25	18	10	13	2	3	5
Total defects of equipment	214	188	177	182	241	*206	215	158	120	148	108	79	76
Misplaced switch	39	28	48	53	67	98	78	54	54	70	69	77	76
Derailing switch	9	5	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Negligence of trackmen or bridgemen	4	2	8	6	14	5	16	8	10	3	5	5	9
Runaway engine or train	14	6	8	1	4	1	9	19	8	14	2	2	2
Open draw	6	2	3	4	4	3	3	5	1	4	4	3	4
Other negligence	19	23	17	39	48	57	38	22	19	26	5	4	6
Total negligence in operating	91	66	91	103	137	164	144	108	92	117	84	91	97
Animals on track	23	24	21	38	50	51	61	56	41	57	33	39	48
Snow or ice	8	9	16	12	16	7	6	6	5	22	17	13	20
Washout	21	23	17	5	16	19	19	18	20	19	21	21	28
Landslide	20	29	25	31	27	30	28	28	24	34	16	7	6
Accidental obstruction	21	26	33	19	32	29	20	28	8	20	32	32	38
Malicious obstruction	18	28	40	62	51	35	53	45	25	36	30	13	15
Other unforeseen obstructions	3	7	2	11	5	8	5	13	8	5	8	3	3
Total unforeseen obstructions	114	146	154	178	197	179	192	194	131	193	157	128	158
Others	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	5
Unexplained	353	314	293	296	423	425	439	377	296	385	184	231	224
Total derailments	873	792	810	873	1,212	1,165	1,204	1,004	759	1,032	723	646	709
ACCIDENTS WITHOUT COLLISION OR DERAILMENT:													
Boiler explosions	11	15	12	9	24	19	19	21	13	15	15	14	10
Broken parallel or connecting rod	13	6	10	12	8	10	8	9	5	22	22	14	10
Cars burned while running	10	4	17	16	18	13	19	15	4	7	10	8	9
Various breakages of rolling stock	3	12	8	10	18	20	28	27	21	22	21	9	16
Other causes	17	14	28	27	31	38	29	29	18	33	8	1	6
Total without collision or derailment	54	51	75	74	99	100	103	101	61	99	76	46	51

RECAPITULATION.

Collisions	73	514	602	613	996	1,062	1,137	1,041	749	804	548	417	295
Derailments	87	792	810	873	1,212	1,165	1,204	1,004	759	1,032	723	646	709
Other accidents	5	51	75	74	99	100	103	101	61	99	76	46	51
Total	1,658	1,357	1,487	1,560	2,307	2,327	2,444	2,146	1,569	1,935	1,347	1,109	1,055

* Train mileage is taken from Poor's Manual, which gives revenue mileage only; that for 1897 is estimated.
† Average per year, for five years.

TABLE NO. 2.—CASUALTIES TO PASSENGERS AND EMPLOYEES IN TRAIN ACCIDENTS IN 1897.
Tabulated according to classes of causes.

Month.	Defects of road.				Defects of equipment				Negligence in operating.				Unforeseen obstructions and maliciousness.				Unexplained.				Total.			
	Pass.		Emp.		Pass.		Emp.		Pass.		Emp.		Pass.		Emp.		Pass.		Emp.		Pass.		Emp.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
January	0	8	1	5	0	0	1	1	2	25	16	31	0	0	7	10	0	7	1	11	2	40	26	58
February	0	7	1	2	0	11	3	6	2	9	7	21	0	12	4	8	0	2	6	3	2	41	21	40
March	0	0	4	1	0	2	2	5	0	9	8	24	3	1	11	9	1	14	7	8	4	29	32	47
April	1	11	2	6	0	0	3	7	0	2	6	30	1	11	2	2	0	4	3	9	2	28	16	54
May	0	8	2	6	0	0	4	2	0	20	5	6	0	0	0	2	0	5	0	1	0	33	11	17
June	0	10	9	4	0	10	3	7	4	50	14	31	0	0	4	2	0	2	2	3	4	72	32	47
July	0	15	2	7	0	3	2	4	0	17	3	19	0	5	9	10	0	10	0	16	0	50	16	56
August	0	10	2	2	0	0	3	4	2	50	7	39	0	0	0	2	0	7	5	8	2	67	17	55
September	1	11	1	3	1	32	1	4	14	35	31	53	0	0	6	6	0	0	0	2	15	78	39	68
October	0	2	1	2	2	21	0	6	2	8	14	42	0	0	1	4	19	10	9	11	23	41	25	65
November	0	10	1	5	4	16	5	7	0	19	10	47	0	20	3	9	1	38	4	17	5	103	23	85
December	0	0	1	2	0	0	0	5	2	49	16	108	0	0	0	5	0	1	1	15	2	50	18	135
Year	2	92	27	45	7	95	27	58	28	293	137	451	4	52	47	69	21	100	38	104	62	632	276	727
Year, 1896	11	144	22	42	0	32	48	41	89	310	154	349	23	97	59	84	5	35	35	85	128	618	318	601
Year, 1895	2	106	16	69	4	52	30	73	17	378	157	415	6	43	46	100	9	122	53	82	38	701	302	739
Year, 1894	3	33	23	70	5	19	24	56	127	202	136	462	16	95	61	145	7	61	36	112	58	410	280	845
Year, 1893	15	336	32	121	3	64	47	75	52	634	243	742	1	56	156	167	7	150	46	138	178	1 240	424	1,243
Year, 1892	23	322	39	103	2	85	61	93	178	514	271	718	5	88	72	177	8	117	47	113	116	1,126	493	1,204
Year, 1891	24	291	45	101	7	90	42	65	114	458	345	939	23	116	57	154	9	228	61	188	177	1,183	550	1,447
Year, 1890	19	195	61	126	4	86	30	77	15	624	337	959	24	103	60	165	10	216	81	192	172	1 224	569	1,519
Year, 1889	16	167	30	81	7	58	24	63	46	291	189	595	34	107	53	120	5	122	40	119	108	745	336	978
Year, 1888	5	195	45	153	16	65	35	92	92	388	217	573	11	106	77	163	44	258	60	117	168	1,012	434	1,098

The information given in the large table published herewith covers the same ground as in previous years, and the table is self-explanatory. We may repeat that the record is in no sense official, being gathered mostly from newspaper accounts which we find in local papers published in all parts of the country. Inquiry is made, however, of the officers of the roads concerned, for the purpose of confirming the reports of the more serious accidents, especially those in which passengers are injured and those of which the cause is unusual or obscure. The classification of the accidents in the table is somewhat arbitrary, accidents which are due to two or more causes being shown under the head only of the more prominent cause.

The total number of casualties to persons recorded during the past six years is shown by years in the following table:

	1897.	1896.	1895.	1894.	1893.	1892.
Passengers killed	62	128	38	58	178	116
Emp. killed	276	318	302	280	424	490
Others killed	79	94	75	104	89	66
Total killed	417	540	415	442	691	672
Passengers injured	632	618	701	410	1,240	1,128
Emp. injured	727	601	739	845	1,243	1,205
Others injured	113	78	95	88	101	74
Total injured	1,472	1,297	1,535	1,343	2,584	2,407
Train mileage, millions*	850.7	834.2	818.4	889.4	864.9	
No. persons killed per million train-miles	0.646	0.497	0.540	0.777	0.777	

* Train mileage is taken from Poor's Manual, which gives revenue mileage only.

The relative frequency of the more prominent causes of collisions for six years past is shown in the following table:

	1897.	1896.	1895.	1894.	1893.	1892.
Train breaking in two	155	93	96	88	118	101
Misplaced switch	48	51	42	50	80	90
Failure to give or observe signals	58	33	64	54	108	140
Mistake in giving or understanding orders	33	48	35	31	67	78
Miscellaneous	149	99	117	166	240	201
Total explained	443	324	354	389	613	610
Unexplained	288	190	248	224	393	452
Total	731	514	602	613	996	1,062

It will be observed that in the record for 1897 the increase in collisions is much larger than in derailments, and that of the collisions those caused by trains breaking in two constitute the most numerous single class. These increased 66 per cent.; all collisions 42 per cent.; miscellaneous causes 50 per cent. Practically all collisions are due to negligence in operating, except those resulting from failures of couplings or drawbars, and some of these are due to unskillful management of trains in passing over summits. Of derailments, on the other hand, a large proportion are due to causes beyond the control of trainmen or station men. Looking at the record as a whole, therefore, we find an improvement in the safety of the roadway and in the soundness of cars and engines, as compared with the care and vigilance of the men directly concerned in running the trains. The feature in which cars do not show improvement is the couplings (failures of which figure in both collisions and derailments). To many observers this will be readily explainable by the increase in train loads (which has taken place not only where larger engines have been introduced but also in consequence of the more careful loading of engines) in connection with other obvious circumstances.

We have noted the more serious street railroad accidents as we have found them in newspapers, and we are now able to give these statistics for four years, as follows:

STREET RAILROAD ACCIDENTS.

	* 1897.	1896.	1895.	1894.
Number of accidents	108	182	117	61
Number of persons killed	31	37	45	8
Number of persons injured	355	545	298	100

Practically all these accidents occurred on lines worked by electricity. No new or unusual causes appeared in the street railroad accident list for 1897; but butting collisions on the open road—that is, upon lines running from one town to another, and on which the circumstances are often similar to those of a light steam railroad—have been a prominent feature. An example of this kind of accident is that which occurred in Michigan in December, noted in our report for that month, where two electric cars running toward each other on a single track came violently into collision and three persons were killed.

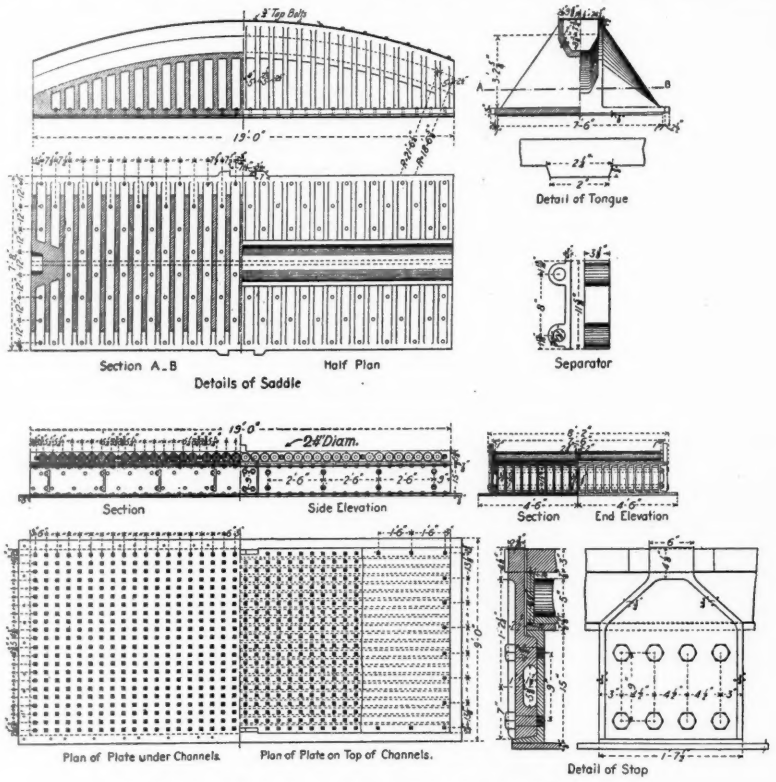
The Danish passenger tariff adopted in 1896, some account of which we have given heretofore, is unique in its provisions. The main feature of it is the small additions to charges for considerable increases in distance above 100 kilometers. Within that distance the fares vary with the distance. Then a uniform rate is made for distances between 100 and 110 km., another for distances 11 km. greater, a third for distances 23 km. greater, a fourth for distances 25 km. greater, and so on, each succeeding zone being 2 km. wider than the preceding one, and the next to the last one being 51 km., or 32 miles, wide, from 625 to 676 km. The highest fare is good for all distances over 676 km., few of which can be found in Denmark. The fares increase by a uniform amount for each zone after 121 km., 6.7 cents for the third class, and generally (but not regularly) twice as much for the second class and three times as much for the first class. The fare for 100 to 110 km. (62 to 68 miles) is 63 cents third class, $1.08 second class and $1.1 first class. The application of the tariff makes them for distances of 90 to 105 miles 91 cents, 1.35 and $2.16; for distances of 181 to 201 miles, $1.14 $1.89 and $3.04, and for distances between 388 and 420 miles, $1.68, $2.83 and $4.42. Thus the first-class fare, which is 2.76 cents per mile for 62 miles, is only 1.05 cents per mile for 420 miles. A comparison with the Prussian round-trip fares, which are one-fourth lower than two single fares for the same distance, shows the Danish fares to be the higher up to distances of 90 miles, and for greater distances lower, and of course greatly lower for considerable distances, as the Prussian fares per mile are the same for all distances. For 400 miles and thereabouts the Prussian round-trip fares are twice as high as two Danish fares.

NEW PUBLICATIONS.

The Strength of Materials. A text book for Manual Training Schools. By Mansfield Merriman, Professor of Civil Engineering in Lehigh University. New York: John Wiley & Sons, 1897. 12mo, pp. 124. Price $1.

Professor Merriman says in his preface that he has attempted to give a presentation of the subject of the strength of materials, beams, columns and shafts, which may be understood by those not acquainted with the calculus. The mathematics required to read the book include only arithmetic, algebra, geometry and elementary mechanics. The aim has been to present the subject in such a way as to cover the essential principles and methods, and at the same time to bring it within the comprehension of the higher classes of manual training schools. The book deals mainly with questions of strength, the subject of elastic deformations occupying a subordinate place. All the rules for the investigation and design of common beams, including moment of inertia, are presented by simple algebraic and geometric methods. Special effort has been made to clearly present and thoroughly illustrate the mechanical ideas involved. It goes without saying that Professor Merriman has presented the subjects taken up, with clearness, simplicity and compactness.

The project of publishing such a book for this special audience is novel and in a business sense experimental. We should suppose, however, that the book would have a considerable sale, not only among the students for whom it was especially written but among men practising as engineers, who have not had the mathematical training necessary to enable them to read and use the more elaborate treatises. And further, it will very likely be found convenient for engineers whose mathematics have grown rusty and who wish to brush up their fundamental ideas. We should not be surprised if the book becomes popular.



Details of Rollers and Bed for Saddles—Main Towers.

The Massachusetts Special Street Railroad Report.

The special committee appointed by the Governor of Massachusetts last July, consisting of Charles Francis Adams, William W. Crapo and Elihu B. Hayes, has made its report to the state Legislature on the relations of street railroads and municipalities to each other. The full report has not yet been published, but the principal recommendations are given out as follows:

1. That the corporation tax now collected by the state on the excess of the share value of a company above the value of the real property be distributed to the cities and towns containing the tracks of said company in proportion to the mileage in each, instead of to the localities where the stock of the company is owned.

2. That where dividend payments exceed eight per cent. the street railway companies be required to pay into the state treasury a sum equal to the excess, except where a company has failed to earn an average of six per cent. annually from the time of its incorporation.

3. That a franchise tax additional to that now imposed in the manner noted in the first paragraph above be levied on the gross earnings of the companies, the rate varying from two per cent. where gross receipts per mile of track operated shall amount to $7,000 or less a year, to three per cent. where such receipts amount to $28,000 a mile or more.

4. That cities and towns be permitted to buy in existing street railway track at the cost to replace it, and to construct new track or extensions as the public convenience may dictate, the local government thereafter to maintain the way as it maintains other parts of the streets, and to be compensated therefor by the company or companies using the tracks in the sum fixed by mutual agreement or by a referee, for periods of seven years.

New East River Bridge.

(*Continued from page 97.*)

blooms or slabs which are of a size to reduce 16 times in area in forming the shape.

All rolled and hammered shapes shall be entirely free from piping, checks, cracks or other imperfections, and shall have smooth finished edges and surfaces.

Rivets cut out of work into which they have been driven shall be tough and show a silky texture without crystalline appearance.

All castings shall be sound and as free from blowholes as the latest and best practice in steel casting can produce.

Each casting shall have not less than two coupons from which to cut specimens for testing.

All steel fractures shall show a fine silky texture of a bluish gray or dove color, and be free from black or brilliant specks.

Rigid tests will be made for red shortness.

The towers and end spans will be made non-adjustable, hence requiring all parts to be accurate in length. This applies especially to the towers, which will be stiff braced.

The main girders and beds for supporting the saddles at the tops of the towers must be of especially fine workmanship.

All plates and angles to be riveted which do not exceed ¾ of an inch in thickness, must be punched ¼ of an inch less in diameter than the rivets to be used; and, after being straightened, shall be assembled and reamed to the size proper to admit the rivets. Those thicker than ¾ of an inch shall be assembled and drilled to the proper size to admit the rivets, without punching. The plates and angles shall then be taken apart, and all fins shall be removed from the edges of the holes by a countersinking tool, which shall slightly fillet them. All sheared edges must be removed by a planer to the depth of at least ⅛ of an inch.

Whenever practicable all rivets shall be machine driven, both in the shop and in the field, and whenever hand riveting is necessary the entire driving must be done with sledges weighing at least one pound. Previous to assembling for riveting all steel for the main towers shall have the mill scale entirely removed by sand blast and must be fully protected from rust either by oiling or painting until it is ready to leave the shop.

All pins having diameters greater than 6 in. must have holes 1½ in. in diameter, concentric with their cylindrical surfaces, drilled through from end to end.

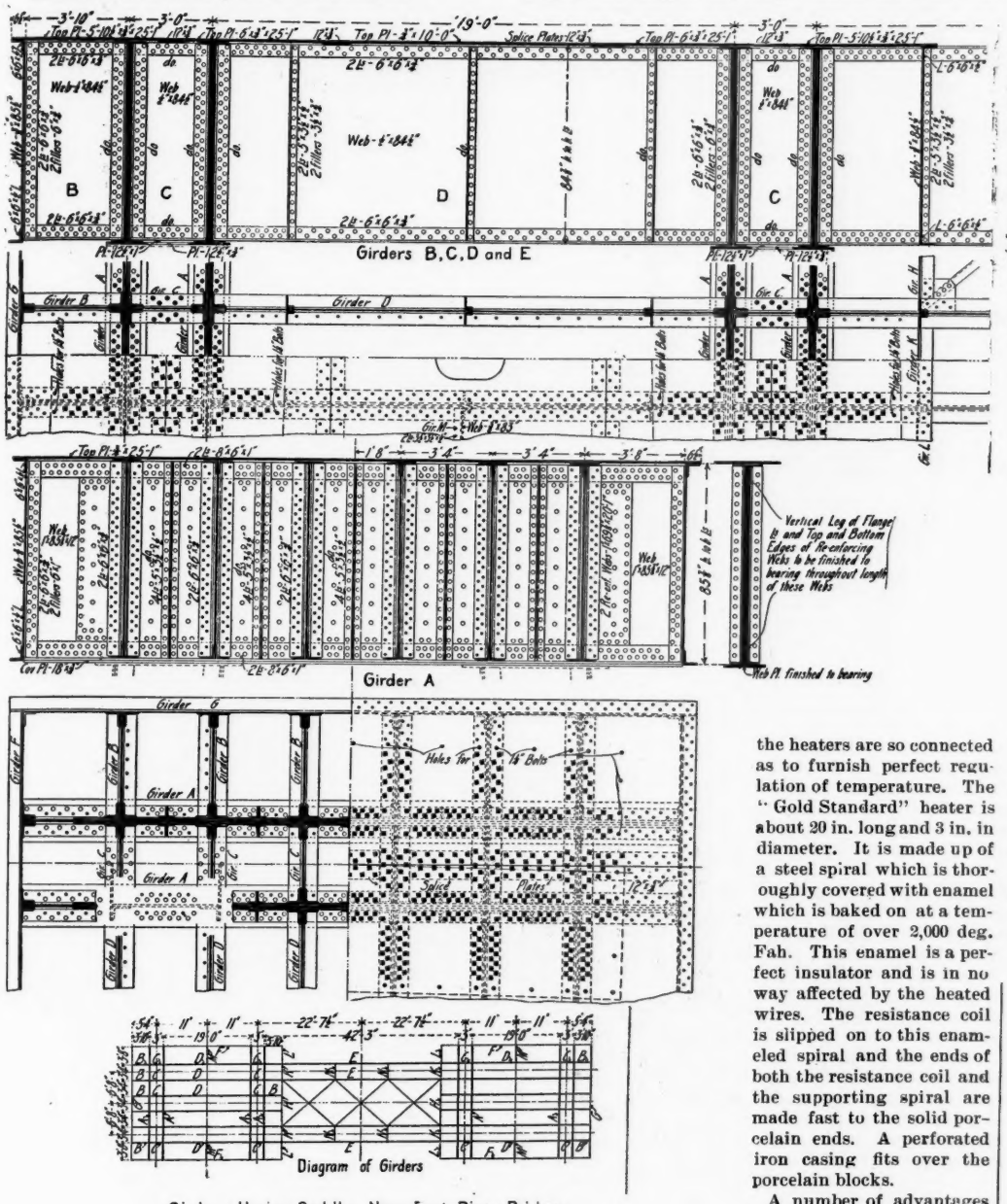
All pin holes must be bored smooth and true to diameters not exceeding $\frac{1}{50}$ in. larger than those of the pins to be used.

To secure thorough ventilation and access, each main tower leg will be provided with an opening at the bottom, and a continuous passage from the bottom to the top, where there will be another opening to allow passage to the saddle floor. Each opening at the bottom will be provided with a steel door, and there will be a substantial iron ladder from the bottom to the top in the interior of each leg.

Each foot-casting of the main towers will be secured to the foundations by four steel anchor bolts, 2½ in. in

diameter by 7 ft. in length from the under side of the head to the key-end, the upper end upset for the thread.

After the foot-castings are accurately placed on the foundations, 3-in. holes will be sunk to the necessary depth in the masonry, to receive the anchor bolts. These holes must be sunk with a diamond drill by the contractor, who must place the bolts and fill the space around each bolt solidly with cement mortar.



Girders Under Saddle, New East River Bridge.

Each foot-casting of the intermediate towers will be secured to the masonry by one steel anchor bolt, 2½ in. in diameter, with both ends upset. On the lower end will be a cast washer. This bolt will extend from the top of the foot-casting to the under side of the dimension masonry, as shown on the drawings.

The specifications conclude thus: As by far the greater part of this work can be executed only by bridge establishments of the first class, bids will be received only from such parties as have the requisite plant and facilities, which have been in successful operation on work of similar character for at least one year. The bidders must be in the opinion of the Commissioners fully qualified both by experience and in appliances to execute work of this character and importance according to the highest standard of bridge work at the present time.

It will be noted from the drawings that the cantilever span is carried some distance beyond the intermediate pier, thus relieving the main tower of a portion of the load, which makes necessary the hinge bearing at the intermediate tower.

The Gold Electric Heaters for the South Side Elevated, Chicago.

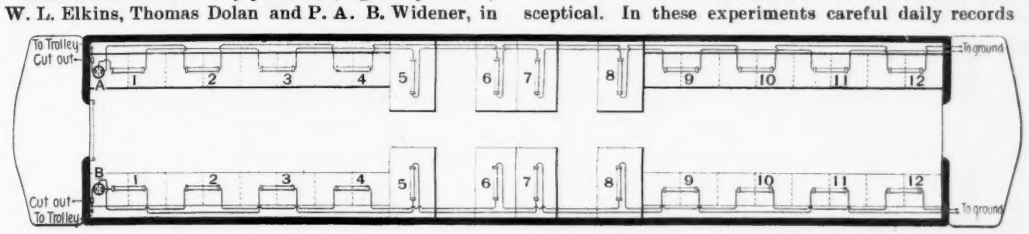
The equipment of the South Side Elevated Railroad, of Chicago, with electric power on the Sprague system is rapidly nearing completion. During the past winter the road has made some very careful and extensive tests of the electric heaters made by various companies which have made a specialty of electric heating. Each of these companies had the privilege of equipping a car, and the five cars thus supplied with heaters were run during the past winter. The result was that the contract for the entire work, which calls for about 3,000 electric heaters, was awarded to the Gold Car Heating Co., of New York and Chicago.

The car which was at the disposal of this company was supplied with 24 of the improved "Gold Standard" electric heaters. These were wired to permit of four graduations of temperature, which was controlled by a regulating switch. The car was comfortably heated in the coldest weather and the regulation of the temperature to suit the outside conditions was entirely satisfactory; uniformity of the temperature was maintained in all parts of the car.

The accompanying diagrams show the position of the electric heaters in the car. As may be observed from Fig. 1, the wiring is very simple and at the same time the heaters are so connected as to furnish perfect regulation of temperature. The "Gold Standard" heater is about 20 in. long and 3 in. in diameter. It is made up of a steel spiral which is thoroughly covered with enamel which is baked on at a temperature of over 2,000 deg. Fah. This enamel is a perfect insulator and is in no way affected by the heated wires. The resistance coil is slipped on to this enameled spiral and the ends of both the resistance coil and the supporting spiral are made fast to the solid porcelain ends. A perforated iron casing fits over the porcelain blocks.

A number of advantages are claimed by the makers for this heater. The resistance wire is made of a special composition and is absolutely non-corrosive. The resistance coil is wound on an open pitch, and when placed on the spiral is under no tension.

A free circulation of air about the coil is obtained and as there is nothing to obstruct the passage of the air through the heater, the greater part of the heat is distributed into the car body at the least expense of current. The heaters are light in weight, neat in design, and at the same time strong and durable.



Four graduations of heat. Two graduations regulated on each side. Both sides being independent. Each side being controlled by a separate two-point switch.

Two-point switch *A*.—Point No. 1 takes 5 amperes, voltage 500. Point No. 2 takes 10 amperes, voltage 500.

Two-point switch *B*.—Point No. 1 takes 5 amperes, voltage 500. Point No. 2 takes 10 amperes, voltage 500.

When the switch *A* is turned to point No. 1 the current passes through heaters Nos. 1, 3, 5, 7, 9, 11 in series.

When the switch *A* is turned to point No. 2 the current passes through heaters { Nos. 2, 4, 6, 8, 10, 12, and " 1, 3, 5, 7, 9, 11 } in multiple / series.

When the switch *B* is turned to point No. 1 the current passes through heaters Nos. 2, 4, 6, 8, 10, 12 in series.

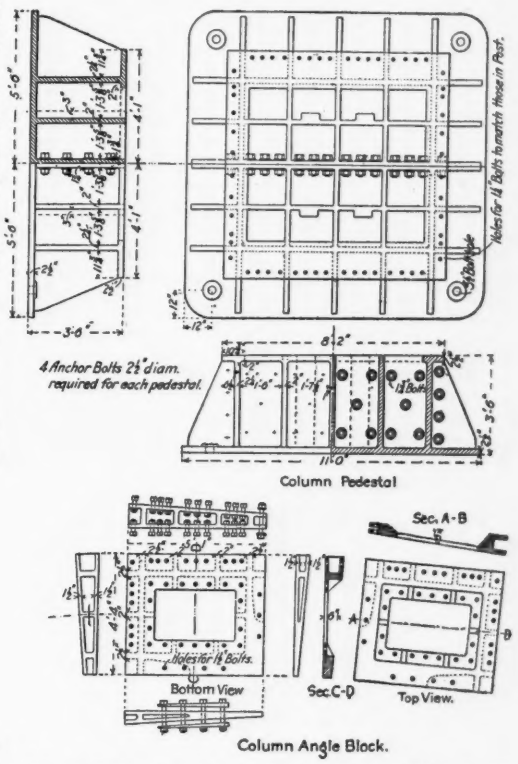
When the switch *B* is turned to point No. 2 the current passes through heaters { Nos. 2, 4, 6, 8, 10, 12, and " 1, 3, 5, 7, 9, 11 } in multiple / series.

Fig. 1.—Arrangement of the Gold Electric Heaters in Cars of the South Side Elevated, Chicago.

Compressed Air Traction in New York.

A letter has been recently published, signed by Messrs, W. L. Elkins, Thomas Dolan and P. A. B. Widener, in which those gentlemen say that from reports made to them by Mr. Pearson, Chief Engineer of the Metropolitan Street Railway Company, they consider the compressed air system, as used on the lines of the Metropolitan Street Railway, a success, and that "the Metropolitan Street Railway Company are now equipping additional cars to operate on their lines." They add that Mr. Pearson states, and that they agree with him, that the compressed air system has been perfected to such a degree as to warrant its adoption.

It will be observed that this is a very strong endorsement from a commercial standpoint, considering the experience and the position in traction matters of the gentlemen who make the statement, and of course the statements of Mr. Pearson are of great weight in a mechanical way.



Column Pedestal and Angle Block at Base of Main Tower.

So far as concerns the work of equipping additional cars for the Metropolitan Company, we have no further information than that which was published in these columns a few weeks ago, namely, that Mr. Vreeland had definitely urged and advised, and that it will probably soon be decided, to put compressed air motors on the Twenty-eighth and Twenty-ninth street lines, to work the entire traffic there without any other method of traction. If the work is done under such conditions the compressed air motors will have an opportunity to demonstrate without any question their fitness to handle this kind of traffic, and it is highly desirable, in the interest of science, as well as in the interest of investors and the public, that a large-scale experiment of this sort should be carried out, considering the advanced state of the art of the use of compressed air motors.

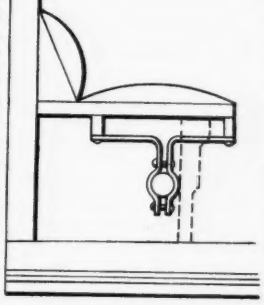


Fig. 2.—Location of Heater under Car Seat.

Of course the reader knows that such an installation would not be a new experiment in New York City. The letter quoted above refers definitely to experience on the lines of the Metropolitan, and similar motors have been run for more than a year on 125th street with a success that has astonished some of those who were most sceptical. In these experiments careful daily records have been kept of consumption of air and of work done, and these records are available for the investigator.

The cable from Pará up the Amazon to Manáos, which parted in several places shortly after being laid, has been repaired, and it is announced that communication between the two cities has been re-established.

The Sheffield Improved Standpipe No. 6.

The Sheffield Car Co., of Three Rivers, Mich., has recently designed and improved, direct-acting, automatic stand-pipe, the details of which are shown in the accompanying cut. This improved form of standpipe retains the desirable features of former pipes, namely, (1 a) flexible spout, (2) freedom from water hammer by reason of operation of the valve by pressure of water in the main, thereby allowing the speed of opening or closing to be regulated at the will of the man in charge, (3) positive locking of pipe parallel to track when not in use, (4) automatic drain valve. It has also the following advantages over pipes heretofore made by the company:

Free passage of water; this is obtained by horizontal main valve permitting water to enter the vertical column direct by only one change in direction of flow from horizontal to vertical; this, so far as is known to the company, is not obtained in any other pipe.

Accessibility of parts, as all operating mechanism is on outside of pipe.

Convenience. The operating lever is so situated as to be within more convenient reach of the fireman than in other pipes and requires a smaller motion to open or close valve.

Ease of repair in case of accident, as the valve can be removed from the pipe in the pit by simply taking off the cylinder head and taking it out, the pipe itself not requiring to be molested.

Non-corrosive. The cylinder being lined with brass is not subject to the action of corrosive waters.

Less liability of leakage. The valve, being provided with rubber seat, remains perfectly tight under all pressures.

This pipe is easily turned by one man from the tender or from the ground, as the flexible drop pipe is balanced by counterweight. The whole is pivoted upon a center bearing at the bottom of the upright pipe and is automatically locked with a positive lock whenever the pipe is thrown back parallel with track.

The valve is so made that one end, which is faced with hard rubber, acts as a valve; the other end acts as an hydraulic piston in connection with the operating valve stem, which passes through the center of the valve into the guide bar cast in valve seat. This valve stem has a similar lateral motion of its own before it acts on the main valve; this motion opens or closes water passage from water main to hydraulic cylinder and exhaust from cylinder to water column. The piston being of greater area than the valve, the water pressure in main serves to close and keep closed the main valve. As this valve closes against the water pressure in the main, water ram can be minimized to the lowest point and time of closure can be regulated by adjusting the valve stem to admit water to the cylinder slow or fast, thus closing the valve as conditions may demand.

The water cylinder is all brass and is readily removed. A small cock is provided at the lower side of the cylinder to wash out any sand that may accumulate there. A drain pipe is also provided to drain the pipe in cold weather.

This flexible spout is a very important feature, as it enables the retention inside the pipe of all drip, thus avoiding icy and slippery surface about the track in winter and sloppy places about the crane in summer. This flexibility is secured by a joint of rubber prepared by special processes so that it does not break or injure by cold. This also allows of great variation in height of tenders and is easily adjusted to swing over freight and baggage car roofs.

The Jackson & Sharp Car for the International Correspondence Schools, Scranton, Pa.

The Jackson & Sharp Company has just completed an elaborate car for the Colliery Engineer Company, to be used by the officials of the International Correspondence Schools of Scranton, Pa., for the purpose of interesting persons in all parts of the country in the work of that school.

The car was started out from the works of the Jackson & Sharp Company this week. Rufus J. Foster, Norman Foster and other officials of the Scranton school, which gives instruction by mail, explained to many of the employers its methods and the scope of the work.

The car is 50 ft. long and 9 ft. 8 in. wide over the sills. The interior is divided into a reception room, a storage room, sleeping room and a saloon. The reception room is 18 ft. long, and is finished in quartered oak. It is provided with book cases, a center table, wicker chairs, with cushions, a couch, carpet and curtains. There are four sleeping sections of upper and lower berths, taking up 12½ ft. of the length, giving sleeping accommodations for eight persons. Tables are provided to fit between the seats for holding books and writing materials.

The storage room is 14½ ft. long, and is finished as a baggage car style for the storage of books. There are two lockers in this room. At the extreme end of the car there is a saloon with the usual fixtures. Opposite the saloon is a Baker hot-water heater and a locker.

The platform at the reception end of the car is fitted with a bronze hand railing, brake wheel and stop nosings, while the platform and steps are covered with corrugated rubber.

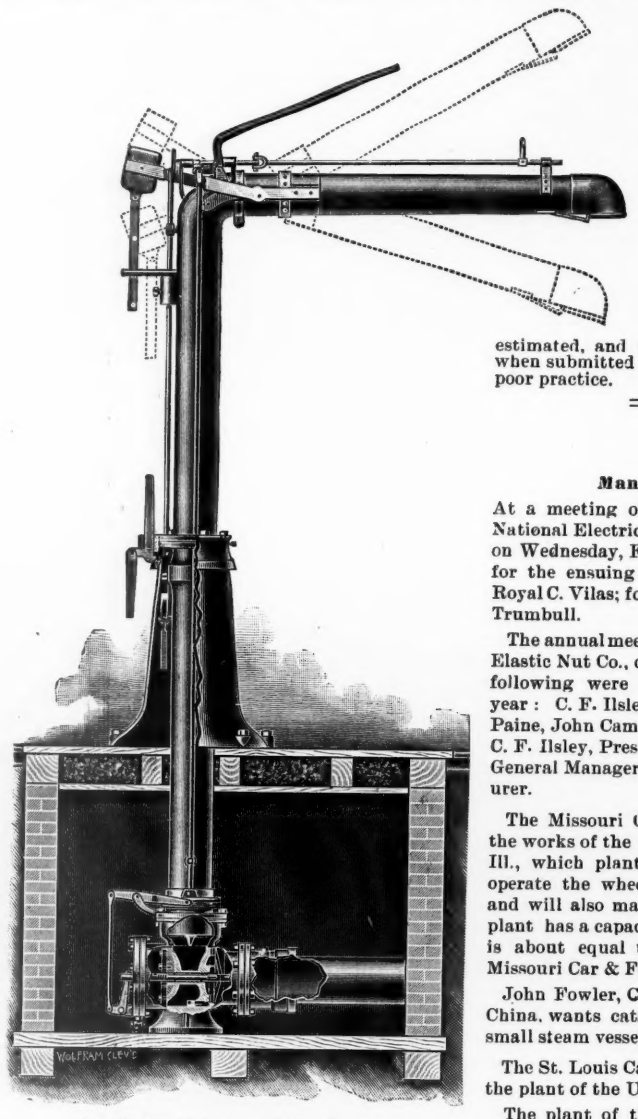
The lamps and trimmings throughout are of polished bronze. The ceiling is of quartered oak veneer, handsomely decorated.

The exterior of the car is handsomely finished. It is painted Brewster green, and lettered and decorated in gold leaf. On the panels between the windows there are suitable inscriptions accompanying the following names, indicating the particular field of science in which each had excelled: George Stephenson, John Fritz, Abraham S. Hewitt, John A. Roebling, George H. Corliss, George Westinghouse, Jr., James Watt, Andrew Carnegie, Thomas A. Scott, Mathew Baird, Sir Henry Bessemer, Capt. James B. Eads, John F. Holloway, Thomas A. Edison, Robert Fulton, Capt. W. R. Jones, John Ericsson and Michael Faraday.

The car is mounted on the King patent trucks, which are designed to prevent any oscillation because of an imperfect roadbed. The wheels are of the Boies pattern with Latrobe tires. The couplers and buffers are of the Janney type, and in addition to the hand brakes the car is fitted with the Westinghouse fixtures. In addition also to the hot water heating apparatus the commingler system of heating by steam is provided.

Shop Etchings.

Mr. J. A. Carney, Master Mechanic, Chicago, Burlington & Quincy R. R., at the last meeting of the St. Louis Railway Club presented a paper entitled "Shop Etchings," from which the following is taken. Many examples of steel and iron etchings have been shown in the *Railroad Gazette* from time to time, therefore we reproduce none of Mr. Carney's engravings:



The Sheffield Improved Standpipe.

Pure iron is readily soluble in all dilute mineral acids. The solubility is affected by even minute traces of impurities, so if there is any unevenness in the composition of the iron some parts are dissolved faster than others, leaving an uneven surface. It is upon this principle that the etching process depends, and as a slight change in chemical composition makes a perceptible change in the solubility of the iron, it can readily be seen what a delicate test is secured by the etching process. As a rule steel is less soluble than iron, and the solubility decreases with an increase in carbon. There is one exception, however: fine grades of charcoal iron are less soluble than low-carbon steel.

The process of etching is exceedingly simple and requires no great knowledge of chemistry or special skill in the manipulation of chemicals. Etchings are made as follows:

The portion of the piece of iron or steel to be etched is planed or turned to a true-plane surface, then draw-filed and finally polished with fine emery paper. This surface must be smooth, perfectly flat and free from scratches. The flat surface is necessary in order to be assured of a good print, and scratches might lead to a false interpretation of the results of the etching.

The carefully prepared surface is thoroughly cleaned with soap and water to remove all grease and then dipped to a depth of about ¼ in. in the etching fluid. The etching fluid is a mixture of 90 parts water, 30 parts sulphuric acid and 10 parts hydrochloric acid. The water is poured into a porcelain dish and the sulphuric acid added slowly, followed by the hydrochloric acid. Care must be taken to add the parts in the order named, because the addition of the water to the sulphuric acid would cause much sputtering, and possibly some of the acid might get on the hands or clothing of the operator. There are no poisonous ingredients in the mixture, and the disagreeable odor coming from the etching is due to hydrogen gas mixed with small quantities of hydrocarbons, and is harmless. The time required to make an etching varies from 10 minutes to an hour, depending upon the material being etched. Low grades of iron etch rapidly, while high-carbon steel etches very slowly.

The practice is to allow the action of the acid to continue until the more soluble portions have been sufficiently dissolved to make a good print, one which will fully show the less soluble portions, while the more soluble portions will not appear. One sixty-fourth of an inch is amply deep. It is easy to determine when a piece of iron is sufficiently etched by observing the depth of the unevenness in the surface, but steel cannot be so judged. Steel is supposed to be homogeneous, and there should be no portions more or less soluble than others. A piece of steel is sufficiently etched when it has taken on the appearance of velvet and feels rough when rubbed with the finger. If the action of the acid seems slow the bath should be heated to about the temperature of boiling water. An alcohol lamp may be used for this purpose. After the etching is finished the sample should be soaked in hot water for 15 minutes to remove all acid that might remain on its surface. This is to prevent subsequent rusting. The etching is now ready for printing. The printing process is almost identical with that of ordinary printing, except that a copy press is used for making the impression. The etched surface is carefully covered with a thin coating of printer's ink, using a printer's roller or a dauber such as was used with the early printing presses. A sheet of rubber about ⅛ in. thick is placed on the bed of the press and acts as a backing for the paper. A sheet of smooth, white paper is laid on the rubber and the inked surface of the etching laid on the paper. A gentle pressure with the press transfers the ink from the etching to the paper. The etching process shows what physical tests and chemical analysis throw absolutely no light upon, namely, the internal structure of the material. Etchings show what lies beneath the scale or the polish on the surface. Internal defects and tricks of manufacture are brought to light which cannot be discovered by the best surface inspection. Its value in shop practice, especially in blacksmith work, cannot be overestimated, and what is considered good smith work, when submitted to the etching test, may prove to be poor practice.

TECHNICAL.

Manufacturing and Business.

At a meeting of the Board of Directors of the Pyle-National Electric Headlight Company, held in Chicago on Wednesday, Feb. 2, the following officers were elected for the ensuing year: For President and Treasurer, Royal C. Vilas; for Vice-President and Secretary, Perry Trumbull.

The annual meeting of the stockholders of the National Elastic Nut Co., of Milwaukee, was held Jan. 27 and the following were elected as Directors for the ensuing year: C. F. Ilsley, E. M. Spalding, Joshua Stark, T. L. Paine, John Campbell. The Board of Directors elected C. F. Ilsley, President; T. L. Paine, Vice-President and General Manager; John Campbell, Secretary and Treasurer.

The Missouri Car & Foundry Co. is about to start up the works of the Madison Car Co., located at Madison Ill., which plant they recently acquired. They wil operate the wheel department and the car department and will also make their malleable castings there. The plant has a capacity of from 40 to 50 cars a day, which is about equal to the capacity of the plant of the Missouri Car & Foundry Co. at St. Louis.

John Fowler, Consul of the United States at Che Foo, China, wants catalogues, with prices of tugs and other small steam vessels suitable for use on canals.

The St. Louis Car Co., of St. Louis, Mo, has purchased the plant of the Union Car Co.

The plant of the Vulcan Iron Works, Chicago, Ill., was badly damaged by fire on Feb. 5. The company manufactures public improvement and outdoor machinery, and its building, which was erected in 1861, was valued at $35,000, on which the loss is estimated at $15,000, only the walls and a part of the machinery being saved. The loss on the contents of the building was about $60,000, the largest loss being on the patterns stored on the fourth floor.

The Davis & Egan Machine Tool Co., of Cincinnati, has purchased from the Morgan Engineering Co., of Alliance, O., a 25-ton electric crane with 50-ft. span which will be placed in its new plant at Covington, Ky. Orders have just been received by this company for lathes, planers, shapers, bolt cutters, drill presses, radial drills, screw machines and brass working tools, amounting to $10,000, from Julius G. Neville & Co., of Barcelona and Madrid, Spain.

The Link Belt Machinery Co., Chicago, is having plans prepared for rebuilding the structure on the west side of Jefferson street, north of Washington street, recently destroyed by fire. The new building will be 178 ft. × 50 ft., with an L 101 ft. × 65 ft. Pressed brick and stone will be used for the exterior and the interior will be of mill construction, with steel girders and columns. The building will be equipped with passenger and freight elevators and steam heat, and work will begin as soon weather will permit.

The United States Car Co.'s works at Urbana, O., were sold Feb. 2, under foreclosure proceedings instituted by the Central Trust Co. of New York, to satisfy a judgment of $2,019,539. The purchaser is Samuel M. Dix, of Chicago, Treasurer of the Illinois Equipment Co.

The Boston Woven Hose & Rubber Co., of Boston, Mass., has removed its offices and warerooms to 540 Atlantic avenue, corner of Congress street. The building affords large warehouse space.

Iron and Steel.

The Berlin Iron Bridge Co., of East Berlin, Conn., has secured the contract for furnishing and putting up the steel framework of the new power house, which the American Coffee Co., of Brooklyn, N. Y., is building.

It is estimated that Russia's pig iron output for 1897 was 1,857,000 tons, an increase of 240,000 tons over 1896.

The works of the Eureka Cast Steel Co., of Chester, Pa., were sold at sheriff's sale for $20,200, the Gartside Estate, the holders of the $20,000 mortgage, being the purchasers.

H. Lloyd's Sons & Co., the proprietors of the Kensington Iron Works, Pittsburgh, Pa., having decided to go out of business, the works are being torn down.

The Tioga Foundry Co., of Philadelphia, Pa., has been chartered, the capital stock being $25,000. The directors are: Samuel A. Kensil, President; Walter L. Taylor, Jacob B. Blankley and Helen B. Way. The two last named are given 56 and 113 shares of stock respectively in consideration of the transfer to the company of the iron foundry at Twenty-second street and Allegheny avenue, Philadelphia.

The West Superior Iron & Steel Co.'s plant was sold on Feb. 7 to George Welwood Murray, of New York, who bid the property in for the reorganization company for $60,000.

Part of the plant of the Laconia Car Co., Laconia, N. H., has been started up after a shut-down of about 16 months. The iron foundry and freight departments have begun work, and the other departments will resume gradually.

H. R. Hall, formerly Superintendent of the Carbon Steel & Iron Company's plant near Mauch Chunk, Pa., has been made Superintendent of the Dunbar Furnace Company's plant at Dunbar, Pa. The appointment took effect Feb. 1. Mr. Hall succeeds Charles McCreery, recently resigned to become Superintendent of the Carnegie Steel Company Furnace at Duquesne, Pa.

New Stations and Shops.

We are officially informed that the plans for a new Union station at Fort Worth, Tex., have not been agreed upon, reports in various Texas daily papers to the contrary notwithstanding. Major G. A. Quinlan, Vice-President and General Manager of the Houston & Texas Central, is Chairman of the committee of railroad officials having the matter in charge.

Press dispatches state that the Southern Indiana will soon commence the construction of a machine shop, store-room, oil-house and sand-house at Bedford, Ind., the machine shop to be equipped with new machinery.

It is reported that the Chicago, Burlington & Quincy will at once rebuild the freight house recently destroyed by fire at East St. Louis.

Plans for the improvement of the Union Station at Canal and Madison streets, Chicago, are being prepared by D. H. Burnham & Co., and as soon as they are approved by the Directors of the railroads using the station the work of remodeling will begin. It is proposed to rearrange the interior of the building, redecorate the rooms and make a new entrance for passengers at the east side directly from the Adams street bridge. The cost of the improvement will be about $50,000.

The new station of the Baltimore & Ohio under construction in Cleveland will be completed about May 1. Three roads, the Baltimore & Ohio, the Cleveland Terminal & Valley, and the Cleveland, Lorain & Wheeling, will use the new station.

Bids on the building of a new station at Houston for the Gulf, Colorado & Santa Fe have been opened, but as yet the contract has not been awarded, though it will be very soon.

Press dispatches state that Macey, Henderson & Co., of Philadelphia, are receiving estimates on a large wooden and iron covering and protecting building for the ferry boats of the Philadelphia & Reading to run into when not in use.

The New Government Building at Chicago.

Washington dispatches announce that on Feb. 2 Henry Ives Cobb, Architect of the Chicago federal building, appeared before the subcommittee of the House Appropriations Committee, and made an argument and statement supporting his estimate that $1,000,000 will be required during the fiscal year ending June 30, 1899, in the construction of the new building. He explained that the contracts for granite and for superstructure, which would be entered into within the next few months, would call for at least that amount, and that he would be prepared in a very short time to advertise for bids for this work.

A 3,000 H. P. Generator for the Louisville (Ky.) Street Railroad.

What will be the largest generator for electric railroad work ever built is now being made at the works of the General Electric Co. at Schenectady, N. Y., for the Logan Street Station of the Louisville Railway Co., Louisville, Ky. The completed machine will have 22 poles, an output of 2,400 KW. (3,000 H. P.), and has been designed for a speed of 75 revolutions per minute to be driven by a 4,000 H. P., cross-compound Allis engine. The generator will be built to carry about one-third overload. The principal dimensions of the machine will be as follows: Diameter of field frame, 19 ft.; width of field frame, 4 ft. 1 in.; diameter of armature, 12 ft. 9 in.; diameter of commutator, 9 ft. 8 in.; diameter of shaft, 2 ft. 3 in.; total weight of armature and commutator, 83,000 lbs.; width of armature, 5 ft.; width of commutator, 21 in.; total width of generator, 77 in. The total weight of generator complete is 174,000 lbs.

The Empire Transportation Company.

We have previously noted the incorporation of this company. The Directors are: Clement A. Griscon, Wm. H. Barnes, Henry H. Rogers, John D. Archbold, Samuel F. Houston, James S. Swartz and Geo. H. Higbee The officers are: Clement A. Griscon, President; Wm. H. Barnes, Vice-President; James J. Hope, Secretary; James S. Swartz, Treasurer; Geo. H Higbee, General Manager, and Gates D. Fahnestock, General Agent. All of these officers hold official positions with the International Navigation Co., which intends to extend its organization to the Pacific coast and operate the Empire line. The boats will comprise the "Ohio," "Indiana," "Illinois," "Pennsylvania" and "Conemaugh." With the exception of the "Conemaugh" these steamers are now at the yards of the Wm. Cramp & Sons Ship & Engine Building Co. being overhauled and equipped for the Alaska trade. They will have accommodations for about 200 first-class and 600 second-class passengers. Each will have modern cabin accommodations, a large dining saloon and will be lighted throughout by electricity, and will also have installed a mechanical refrigerator plant with capacity sufficient to carry fresh provisions for the round trip. The port of departure from the Pacific coast has not been definitely decided upon, but will probably be Seattle, and the steamers will ply between that port and St. Michael, Alaska, where they will transfer their passengers and freight to Yukon River boats, being built by Mr. Nixon at Elizabethport, N. J., for Dawson City. The company will thus control a through line of ocean and river steamers from Seattle to Dawson City.

The Manhattan Steamship Co.

This company was incorporated at Trenton, N. J., on Jan. 20, with a capital of $1,000,000, for the purpose of building, buying, chartering and operating steamships, steamboats and sailing vessels to be used in trade and commerce. The incorporators were Henry E. Alexander, Roland F. Hill, Wm. F. Weiss, of New York; Janathan J. Hillman, of Philadelphia, and Isaac C. Ogden, of Orange, N. J. At a meeting of the stockholders, held at the office of the Corporation Trust Co., in Jersey City, on the 24th, the following gentlemen were elected Directors: Jonathan J. Hillman, Thos. W. Buck, Philadelphia; Henry E. Alexander, Jos. D Huggins, Roland F. Hill, Wm. F. Weiss, Tunis G. Bergen, N. L. Newcomb, of New York; Isaac C. Ogden, Orange, N. J.; Beverly S. Reed, Boston; C. Everett Evans, Taunton, Mass. At a subsequent meeting of the Directors the following officers were elected: Jonathan J. Hillman, President; Jos. D. Huggins, Vice-President; N. L. Newcomb, General Manager; Henry E. Alexander, Treasurer, and Wm. F. Weiss, Secretary.

The Manhattan Steamship Company will operate a steamship service between New York, Maine and the Maritime Provinces. Contracts have already been given for the construction of three steel, twin-screw, double-bottom high speed steamers for freight and passengers, with large space devoted to cold storage.

They will contain 126 staterooms tinted in gold and ivory, with two berths in each. The dining-room will seat 150 passengers. There will be two ladies' grand saloons or social halls. The gentlemen's smoking room will be 30 × 20 ft. and will have a buffet attached. The dimensions of these steamers are 260 ft. long by 45 ft. beam, and they will draw 14 ft. of water, and each will be equipped with two engines, 22 × 36 × 55 × 28 in. stroke; six boilers, 11 ft. 6 in. in diameter by 12 ft. 6 in. long, giving a sea speed of 17 knots per hour.

The Goldie Spike Patents.

We have from Mr. William Goldie, Engineer with Dilworth, Porter & Co., the following letter: "I write to inform you that the United States Court of Appeals for the Third Circuit, at Philadelphia, on the 3d inst., entered up a decree in the matter of Goldie vs. The Diamond State Iron Co., affirming the decision of the District United States Court, sustaining the validity of the patent on the Goldie spike and also that on the machine for its manufacture, and holding the defendants guilty of infringing both patents by their manufacture and sale of the Crescent pointed spike. This decree includes an injunction perpetually restraining the defendants from further infringement of the before-mentioned patents. As there can be no further appeal to any higher court this finally disposes of the matter, after over four years' litigation."

Pig Iron Production in 1897.

The American Iron & Steel Association says the total production of pig iron in 1897 was 9,652,680 gross tons against 8,623,127 tons in 1896, and it was also larger than that of 1895. Of this the state of Pennsylvania produced 48 per cent., the next being Ohio with 14 per cent. Illinois produced almost as much as Ohio and Alabama in the neighborhood of 10 per cent. The increase was almost wholly in the latter half of the year. The production of Bessemer pig iron for 1897 was 5,795,584 tons, an increase over 1896 of 1,140,629 tons; basic pig iron, 556,391 tons, an increase over 1896 of 219,988 tons; charcoal pig iron, 255,211 tons, a decrease of 55,033 tons over 1896; speigeleisen and ferro-manganese, 173,695 tons, an increase of 41,755 tons over 1896.

Compressed Air.

At the February meeting of the New England Railroad Club Mr. Mellen S. Harlow, New England Manager of the Ingersoll-Sergeant Drill Co, presented a paper on "Compressed Air," which was a summary of a good deal of valuable material which has been published in the *Railroad Gazette* and elsewhere within the last two or three years concerning the uses of compressed air, particularly on railroads. His paper closes with some specific description of the compressors built by the Ingersoll-Sergeant Company. We judge that this paper will be published in full in the *Proceedings* of the Club, together with engravings, and, if so, it will be a valuable pamphlet in collecting and making readily available a large amount of useful information.

The Grade Crossings of the Manhattan Elevated.

In a report to the Rapid Transit Commissioners, giving some of the results of his study of the project of the Manhattan Elevated, Mr. William Barclay Parsons, Chief Engineer of the Commission, considers very briefly the important matter of grade crossings as appearing in the project. He says:

"The examination of the map of the proposed extensions would show that the construction of the proposed lines would add seven crossings of the existing lines.

"In this application the company expressly reserves the right to make these crossings either under, over, or at grade. If the latter course were followed it is quite evident that the running of even the present express service would be seriously interfered with, as it is not possible to maintain a high speed of express trains with grade crossings.

"One of the impediments to high speed on the presen elevated railroad is the existence of curves with very short radii, at which points it is necessary to diminish the speed of the trains very materially. In the present application there are six points where curves are introduced in which, if the street itself is to be adhered to as the route, curves of short radii will have to be used, necessitating the diminishing of speed. There is nothing contained in the application looking to the acquiring of private property at these points in order to ease the curves and permit the maintaining of continuous high speed."

The New East River Bridge.

At a public dinner last Friday night Mr. Lewis Nixon, the President of the New East River Bridge Commission, declared in an absolutely unqualified way his purpose to keep Mr. Buck as Chief Engineer and to have the bridge finished in 1901. He said that he realized that it was his business to simply hold up Mr. Buck's hands, which he proposed to do. These statements were received with great enthusiasm by those who heard Mr. Nixon, whose words and manner carried every appearance of sincerity and conviction.

Pneumatic Interlocking at Buffalo.

The Pneumatic Railway Signal Co., of Rochester, N.Y., has installed for the New York Central at Buffalo an extensive pneumatic interlocking plant. It works the switches and signals at the west end of the Exchange street Union passenger station. This apparatus, worked wholly by compressed air at low pressure, without the intervention of electric or manual power, was described in the *Railroad Gazette* of Dec. 22, 1893, in connection with an account of the signals at the crossing of the Delaware, Lackawanna & Western and the Western New York & Pennsylvania, in Buffalo. The Pneumatic company's apparatus has been in use for some time on the Toronto, Hamilton & Buffalo.

Noise on the Park Avenue Viaduct.

Those who remember the conditions in New York just after the opening of the elevated railroads will remember that a tremendous fuss was made about the noise of the passing trains and that the company was driven to many experiments in its efforts to find a way to lessen this noise. All of these efforts have long since been abandoned, except the muffling of the exhaust, which is effectual, and we suppose the people living along the lines have become accustomed to the racket. Something the same situation has now arisen on the new steel viaduct of the New York Central south of the Harlem River, but there the noise is not mitigated by wooden ties, as the rails are laid directly an the steel floor. There is unquestionably a good deal of noise. Among the more recent experiments to lessen this is filling in the troughs of the floor with a mixture of wood chips and concrete. This has been done for a short distance and only experimentally. The structure is so stiff and heavy that the vibrations of the metal are less than they would be on a lighter structure and the noise is no doubt less, and very likely the people alongside will gradually become accustomed to it, and the experiments which are now making will pass into history as have those made on the elevated.

THE SCRAP HEAP.

Notes.

Record discipline (abandonment of suspensions) was adopted on the Burlington, Cedar Rapids & Northern Feb. 1. Records are to be kept by heads of departments.

On Sunday, Feb. 6, a special newspaper train over the Erie Railroad ran from Jersey City to Buffalo, 425 miles, in 8 hours 12 minutes. The time from Jersey City to Port Jervis, 88 miles, was 89 minutes.

In a mail car on a Lehigh Valley train, near Wilkesbarre, Jan. 26, two mail bags and their contents were badly damaged by the explosion of torpedo signals in a bag lying on the floor of the car. Some damage was done by fire.

The principal railroad companies of Mexico have pro-

tested against the contract made by the Mexican government with the Western Union Telegraph Co. and the exclusive arrangement with that company for through business to and from the United States, which was to go into effect on Jan. 5, has been temporarily suspended.

Numbers of men have been discharged from the shops of the Union Pacific at various points, and press dispatches state that the reduction of shop forces has been about 10 per cent. at all points on the road. The Philadelphia, Wilmington & Baltimore has made an advance of 20 per cent. in the wages of certain roundhouse laborers and others, whose pay some time ago was reduced to $1.10 a day.

Vice-President Bancroft, of the Boston Elevated Ra il way, operating the street car lines in Boston, states that on Feb. 2, the next day after the great snowstorm, his cars carried 100,000 passengers, about one-quarter the normal number. He says that if it had not been for the trouble from wires other than those belonging to the company, not a mile of his track would have been interrupted. In the center of the city, where the wires of the electrical companies are underground, there was no suspension of street railroad traffic.

The Superintendent of the Louisville & Nashville, at Nashville, Tenn., has issued a bulletin showing the results of discipline without suspension on that division for the calendar year 1897. One hundred and seventeen discipline orders were issued, and the aggregate amount of wages that would have been lost if the men had been suspended would have been $4,299.78. The bulletin gives the different causes for which demerits were entered, the cause appearing the largest number of times being "failure to respond to calls." Three hundred and fourteen men had clear records, and their names are printed on the bulletin. Yard Foreman C. W. Brown is specially commended for alertness in saving property from fire. By releasing some freight cars on a grade he saved them from the fire, and also by riding the cars some distance down a grade got out a switching engine equipped with a fire pump. J. L. Page, brakeman, and Ellis F. Jones, fireman, are commended for bravery and coolness at a wreck where a car containing powder caught fire.

The Merchants' Association of New York, though it has made "most earnest efforts to repeat the work which it did last summer" in getting reduced passenger fares for Western retailers coming to New York, has failed to impress the railroads with the importance of making a reduction for the present year, and the Central Passenger Association has refused to comply with the merchants' request. In consequence of this refusal, "a large fund is to be raised" and large resolutions have been passed, advising and requesting the Board of Directors "to prosecute a vigorous fight against discriminations of all kinds affecting the welfare of New York City." The particular crime of these Western railroads which is here aimed at is the granting of reductions to St. Louis and Chicago, while refusing them to New York, which, says the New Yorkers, "is carrying discrimination beyond toleration." The merchants of Minneapolis, on the other hand, appear just now to be all right, the passenger officers of the railroads centering in that city having granted them a round-trip rate of a fare and one-fifth for one week in February, one in March and one in April.

Judge Donovan, in the Michigan Circuit Court at Detroit, has issued a mandamus directing the Michigan Central Railroad to sell to Governor Pingree a thousand-mile ticket for $20, good for himself and family for two years. The Governor applied for a ticket of this kind and, being refused, brought suit. The law requiring railroads to issue such tickets was passed in 1891, and it requires the issuing road to redeem unused coupons at the end of the two-year term. It applies to all railroads earning more than $3,000 a mile yearly. The Michigan Central has never issued such books, claiming that under its special charter, issued in 1846, it is exempt from the operation of this law. The present decision, according to press dispatches, appears to be based on the fact that the Michigan Central has bought or otherwise acquired a number of auxiliary railroads. The company has come into control of so many railroads in the state that if the state does not look out it will control everything, says the court. The decision says that notwithstanding the special powers granted by the Michigan Central charter, the road is still subject to the police power of the state. Judge Donovan cited New Jersey and Georgia decisions.

The New Commissioner of Patents.

Mr. Charles H. Duell, of Syracuse, N. Y., the new Commissioner of Patents, appointed by the President to succeed the late Major Benjamin Butterworth, has long ranked high as a practitioner in patent cases before the courts, and is counted a man of ability and probity. Mr. Duell was born in Cortland, N. Y., in 1850, and is a graduate of Hamilton College. Mr. Duell's father, R. Holland Duell, was at one time Commissioner of Patents. The new Commissioner will have as his assistant Judge Arthur P. Greeley, who has made a record in the Patent Office for knowledge of details and for administrative ability. Judge Greeley entered the Patent Office in July, 1884, as a Fourth Assistant Examiner, and was promoted through the successive grades of third, second and first assistant and principal examiner as the result of standing in competitive examinations.

Proposed Legislation.

Governor Leedy, of Kansas, has put his ideas of needed railroad legislation in print, and is going to send them to every member of the legislature; and if a majority agree with him that the Railroad Commissioners ought to have absolute power to make rates, he will call a special session of the legislature on March 1.

Various organizations of railroad employees in Kentucky have sent to the legislature a protest against the bill passed by the Senate giving the State Railroad Commission power to fix railroad rates. In Ohio a bill has been introduced in the Senate forbidding railroad companies to engage in coal mining. In the legislature of New York all sorts of crude schemes have been presented. One bill, presented by Mr. Cullen, abolishes all wharfage charges on public docks. Another reduces all railroad fares to two cents a mile and thousand-mile tickets to 1¼ cents a mile. Senator Ford has introduced a bill requiring one smoking car on every elevated railroad passenger train. Mr. Fritz proposes to regulate the charges on ferryboats between New York and the principal parts of Brooklyn.

Overhead Wires to be Placed Underground in Chicago.

The Mayor has notified the telegraph and telephone companies that all overhead wires in the downtown streets must be removed by March 1. The plan agreed upon some time ago between the companies and the Mayor contemplated the placing of telegraph wires under ground, and the bunching of telephone wires in cables, thus avoiding single wires which are an obstruction to the Fire Department.

South American Notes.

A rather novel application of overhead wire rope transportation is proposed for carrying merchandise from the head of navigation on the Magdalena River in Colombia to the capital of the republic, Bogotá, about 60 miles. A concession for such a line has been granted to a German named Nicolas Krohne. The Otto system of tramway is mentioned as the one to be employed.

The Brazilian government is asking for bids for the improvement of the port of Pernambuco. Details may be obtained at the office of the Brazilian Consul General in New York.

The Brazilian Central Railroad, which is owned by the state, is passing through a process of reformation as to its management, which it is thought will render its operation again profitable. Meantime negotiations are pending with the Rothschilds and the Disconto Gesselschaft for leasing the line, an offer having been made to advance $25,000,000 to the Brazilian government, besides paying a rental based on the receipts. The question is exciting much interest in the Brazilian congress, a reversal of opinion as to the advisability of leasing the road apparently having occurred.

The scheme for building a great Interoceanic Railroad from Brazil through Bolivia to Chili, with a connection into Peru, is again being agitated, and international agreement to guarantee the capital may be reached between the countries interested. The chief beneficiaries of such a road would be Brazil and Bolivia, its importance to Peru and Chili being secondary, and somewhat doubtful. For Brazil a great trunk line from the coast to Cuyaba may be regarded as essential for the development of her commercial and political strength, and the extension of the line into Bolivia would follow as a matter of course. The question may be raised whether the normal growth of the Mogyana Railroad westward is not a better solution of the problem than an effort to build a new international line. The Mogyana Railroad, a native Brazilian line, is one of the best managed and most progressive railroads in South America. It has now been prolonged almost to the city of Goyaz, for into the interior of Brazil, and if the conditions are favorable for pressing on across the great plains of Matto Grosso at this time, the Mogyana Company would be apt to improve the opportunity.

The report of the Peruvian Corporation, Limited, for the year ending June 30, 1897, reveals no improvement corresponding with the general improvement in the trade conditions of Peru. The net revenue amounted to only $65,750, as against $58,435 for the previous year. The net receipts from the railroads fell from $517,410 to $426,115, a result due to necessary improvements in permanent way and rolling stock, and to extraordinary expenses caused by landslides on the Central Railroad. The income from sales of guano amounted to $285,980, being a slight improvement, which, however, is only apparent, since it includes a penalty of $100,000 damages paid by the Anglo-Continental Guano Works. There is no prospect of an extension of railroads either to the colony in the valley of the Pernné or to Cerro de Pasco. It is probable that the concession for operating the silver mines of Cerro de Pasco, which had lapsed, will not be renewed.

The railroad earnings in Venezuela for the half year ended June 30, 1897, were reported as follows by the *Venezuela Herald*, Caracas, Oct. 23, 1897:

Road.	Receipts.	Expenses.
La Guayra & Caracas	$297,299	$142,802
Puerto Cabello & Valencia	142,811	59,042
Great Venezuelan	202,056	158 060
Southwestern	92,894	41,839
Bolivar	93,668	56,569
Central	13,658	14,495
Carenero	14,084	25,252
Santa Barbara & El Vigia	45,663	111,858
Guanta	9,043	8,790

Proposed Railroad in Africa.

For some time there has been talk of a railroad being built from Djibouti, the principal seaport town of the French Somali protectorate in East Africa, to the city of Harar, in Abyssinia, and there is a reasonable assurance that it will be built. A company whose head office is at 5 Rue Scribe, Paris, are at the head of the enterprise and their Secretary and General Manager is C. Havard, of Djibouti. The line has been surveyed between the two points, which are about 300 kilometers apart, and work has actually commenced at Djibouti and several other points on the line. It is intended to build a meter narrow-gage road.

Dutch Swindlers.

The Philadelphia Commercial Museum, 233 South Fourth street, has issued a list of swindling firms in Amsterdam. It appears that inquiries had been received from manufacturers in relation to parties in Amsterdam who had opened correspondence. The Commercial Museum made an investigation through the Amsterdam police and now places in the hands of its correspondents, for their protection, a list of swindlers with the suggestion that it might be well to publish it in local papers. We have not the space for such publication, nor are we a local paper, but we suggest that any correspondent likely to be interested should address the Commercial Museum for a copy of the list.

Electric Machinery for Malaga.

Consul Bartleman, of Malaga, transmits a newspaper extract which states that two companies have sprung into existence there to supply electric light. One company is German and the other English. The capacity of the English plant at present in operation is 330 kilowatts, and Messrs. Fowler & Co. still have in hand under their contract another set similar to those in use; but the completion of this has been seriously delayed by the strike in the engineering trades. The directors have arranged with the Westinghouse Electric Company, of Pittsburgh, to supply immediately two sets of plants, each of 135 kilowatts capacity, and these are now on the way to Malaga and will be erected early in the new year.

Coro & La Vela Railroad of Venezuela.

Official notice has been received that this road was opened for traffic Jan. 5 under the management of W. I. Fox, formerly of Wheateley, Mass. Traffic on the road has developed to such an extent that new rolling stock is required, for which contracts are about completed. The government of Venezuela has granted the company a new concession to extend its line from the City of Coro to Aetagracia, on the Maracaibo Lake, 120 miles, with a substantial subsidy. Material for this extension will be purchased from the United States. The company's head office is located at 102 Front street, New York city. Jacob Baiz is President and Treasurer. The enterprise is purely American. A. S. Capriles has been appointed Cashier and Paymaster, and Lemure C. Butler, of New York, Auditor and General Ticket Agent.

Lake Notes.

Capt. John Mitchell and others, of Cleveland, will build a steel freight ship 438 ft. long, 50 ft. beam, to cost $250,000, and to carry over 6,000 tons.

About 900,000 tons of iron ore a month is this winter being mined and raised to surface at the mines of the Lake Superior district. No such quantity has ever been mined in the winter before.

One of London's Tunnel Railroads.

The public are not likely to have long to wait now for the opening of the City & Waterloo Railway, which will give the London & South Western direct access from the Waterloo terminus to the heart of the city. The line was completed some time ago, but delay occurred, partly by reason of the dispute in the engineering trade and partly on account of the vast proportions of the underground work, which has been undertaken by the Central London Railway Company at the new station opposite the Mansion House. In connection with the bill promoted by the London & South Western for the coming session, power is sought to acquire extensive property in Lambeth for the further enlargement of Waterloo station. Among the more costly properties to be purchased are All Saints' Church and the schools attached thereto. This extension will absorb practically all that remains of the ecclesiastical parish of All Saints'.—*Transport.*

The Schuylkill Navigation Co.

The Philadelphia & Reading Railway Co., which owns the Schulkill Navigation Co., has made a proposition to supply water to the city of Philadelphia free of cost, the railroad to receive in return a release from its obligation to pay, in installments, one-half the cost of the Pennsylvania avenue improvement which is now being made. It will be remembered that this improvement, costing $6,000,000, was made for the purpose of abolishing grade crossings on the line of the Reading road leading to the Market street terminal. The Schulkill Navigation Co., owning dams and reservoirs, could supply 70 million gallons of water daily for two months. The company is obliged to keep its works in usable condition in order to retain its charter, but there is so little boat traffic that the water could be given away. An officer of the city says that the proposed water supply would be of small value, and the *Public Ledger* says that unless the company proposes to close its canal and its dams in time of drought the gist of its offer is merely to sell the water in the Fairmount locks, which has not been needed at all in recent years. This does not seem to be worth $3,000,000.

The Guayaquil & Quito Extension in Ecuador.

A letter from the Secretary of this company states that the proposed extension of this road, in the Republic of Ecuador, will be from Duran, a point opposite Guayaquil, on the Guayas River to Chimbo, a point at the foot of the Cordilleras, a distance of 65 miles, thence to Quito, the capital of the country, about 230 miles from Chimbo. It will traverse the plateau of Ecuador between the eastern and western chains of the Andes, a thickly settled and highly cultivated section of the country. Among the leading towns to be connected are Riobamba, Ambato, Latacunga, Guamote, Sibambe, Cajabamba, Mocha and Machache. The present government of Ecuador is the strongest in many years, the President, General Don Eloy Alfaro, being extremely popular, and having the undivided support of over three fourths of the entire population.

A French Bureau of Foreign Commerce.

The French Ministers of Commerce and Finance have just submitted to the French Parliament a draft of a law creating a national bureau of foreign commerce, the object of which will be to stimulate the export trade of the country. The demand for this new bureau is based upon the ground that other countries are making inroads upon French trade, even in the colonies of France, and that a comparison of what France sells to several nations with what she buys from them shows an unfavorable balance. M. Poulain, now governor of the Bank of France and until recently director of customs, has pointed out that the annual French importations from Russia exceed $34,740,000, while French exports to Russia were but $4,825,000. A number of facts of similar significance are given, and it is argued that, as Russia is a political ally of France, the commercial intercourse between the two nations should be more equally divided

Oldham (Eng.) Electric Tramways.

The Oldham, Ashton & Hyde Electric Tramway Co. Ltd. has just been appealing to the British public, inviting them to take preference and ordinary capital to the amount of about $400,000. The lines are just commencing construction, the preparation of the permanent way being in the hands of Messrs Dick, Kerr & Co., and the complete electrical equipment being placed with the British Thomson Houston Co. Ltd. (London representatives of the General Electric Co.). The line will be eight miles long, and will run from the boundary of Oldham, through Ashton-under-Lyne, Audenshaw and Denton to Hyde, and will thus serve districts having a population of about 250,000. An important point about this undertaking is that the energy will be supplied by the Ashton municipality under contract with the company. The plant and road will be completed within about 10 months. The engineers are Mr. H.F. Parshall and Mr. Stephen Sellon. This is one of the many undertakings which the British Electric Traction Co. has been exploiting during the past year or two.

The Creeping of Rails.

It is sometimes difficult to determine the causes for the creeping of rails. A displacement of the track will, in some cases, be due to expansion by heat But the creeping is caused principally by the load. The brake effects are, as a rule, easily distinguishable. The uneven running of the wheels is clearly to be seen at sharp curves. The influence of the passage of trains over the joints on the creeping of the rails is shown by the fact that rails with lap joints creep less than rails with butt joints on a superstructure of the same kind. Increasing speed, by putting a larger number of express trains on heavy grades, has not increased the creeping. There may be a connection between this fact and the observation that smooth running cars, at speeds of more than 90 km. (56 miles), pass over ordinary butt joints with scarcely any shock. At high speeds there is not time for the wheels to sink in at the joints.

In order to put a stop to the creeping, use must be made of the load on the track which, in the first place, was the cause of the creeping. Since the introduction of fish-plates, which fasten the rails firmly to the ties at the joints, the creeping has diminished. But under some circumstances, the resistance of the two ties at the joints does not prevent displacements. These ties move with the creeping rails, while the intermediate ties remain fixed; and so more ties should be firmly fastened to the rails. The various angles used for this purpose have answered very well, provided that they are bolted to the rail and firmly grasp the tie. It has been found that long angles which fasten two of the intermediate ties together to the rail are even better than angles on single ties. Varying with the length of rail and the degree of creeping, one to three pairs of ties, besides the joint ties, must be connected to the rail.—*Centralblatt, etc.*

Paris Municipal Railroad.

A scheme or system of rapid transit for the City of Paris was adopted recently, after several years study of the needs and cost of such an improvement. The project contemplates a number of connecting railroads, to be operated by electricity, and it is expected that a portion of the line will be in operation some time next year. There will be seven distinct routes, with a number of crossing or connecting lines, forming a network that should afford excellent facilities for intercommunication to various parts of the city. The total length will be 41 miles, of which 25 will be underground, seven in open cutting, and about the same on viaduct. The motor cars to be used will seat 44 passengers and weigh 20,000 lbs., exclusive of passengers. It is proposed to run trains of four cars, only one of them being a motor car (which will probably receive current for its operation from a third rail), and the other three of practically the same size and seating capacity, but weighing only 13,000 lbs. For the speed and frequency of the trains as proposed, it is calculated that about 25,000 H. P. will be required. The estimated cost of road and equipment is to be $36,000,000.

O. R. & N. Industrial Department.

The Oregon Railroad & Navigation Co. has lately established an industrial department as a branch of the traffic department. The agent in charge is Mr. R. C. Judson. The new department will not only do everything possible to aid the establishment of manufacturing industries of all kinds, but will promote irrigation enterprises and the improvement of live stock, and help farmers, lumbermen, miners and fishermen in every way possible. Conventions with instructive addresses will be arranged at suitable places whenever opportunity offers. The department has already secured the establishment at La Grande, Ore., of a beet sugar factory which can make 350 tons a day. This factory will be ready to begin work next October. In parts of Eastern Oregon the climate is quite similar to that in the Texas Panhandle, where cotton is grown, and the officers of the road think of trying some cotton in Oregon the coming summer. Cotton raised in Oregon could be delivered in Asia at from 5 to 10 mills less per pound than from the Southern States.

Commerce of Leading Ports.

The complete returns of the foreign commerce of the United States during 1897 permit some interesting comparisons with the record of previous years, and with the comparative volume of business at different ports. The summary of imports and exports shows that both the Atlantic and Pacific ports showed large gains in imports in 1897 as compared with the previous year, but that the Northern border and Lake ports received only the old volume of trade. On the side of exports, however, the Northern border ports and those on the Gulf of Mexico shared in the increased volume of business caused by the demand for our cereals and manufactured products. The following table gives the comparative figures by sections for the last two years:

IMPORTS.

	1896.	1897.
Atlantic ports	$564,591,938	$616,344,894
Gulf ports	19,698,471	21,270,085
Pacific ports	43,104,332	51,804,989
Northern border and lake ports	46,965,529	46,733,790
Interior ports	7,219,286	6,477,592
Total	$631,579,556	$742,631,350

EXPORTS.

	1896.	1897.
Atlantic ports	$701,114,790	$772,217,078
Gulf ports	182,499,856	192,610,594
Pacific ports	59,140,338	61,707,374
Northern border and lake ports	63,081,720	70,208,508
Interior ports	537	.....
Total	$1,005,837,241	$1,099 743,554

—*Journal of Commerce.*

The Anti-Scalping Bill.

The anti-scalping bill was reported to the House of Representatives at Washington Jan. 24. On Feb. 4 the Senate Committee reported its bill to the Senate. Two amendment were added, one offered by Senator Tillman, of South Carolina, forbidding all free transportation, except as allowed by section 22 of the Interstate Commerce law and prescribing strict regulations for the issue of passes. The provision is to the effect that all passes must be signed by an officer specially authorized by the directors, and the record of passes issued must be at all times open to the inspection of the Interstate Commerce Commission. The clause allowing the original purchaser of a ticket to sell it was made unconditional.

The Anti-Scalping Bureau of Information, which maintains an office at Washington, has issued a pamphlet of 35 pages giving letters from general passenger agents all over the country denying the statements of the scalpers before Congress that the railroads freely sell tickets to scalpers, and that general passenger agents sometimes make ticket-sellers divide commissions. Most of the letters also express the hope that Congress will pass the anti-scalping law.

The Lower House of the Iowa Legislature has passed a resolution asking Iowa members of Congress to vote against the pooling and the anti-scalping bills. The vote was 34 to 33, the Republicans voting against the resolution.

Lectures at Purdue.

Mr. Robert Quayle, Superintendent of Motive Power and Machinery of the Chicago & Northwestern, delivered a lecture in the mechanical laboratory at Purdue Jan. 26 before the senior and junior classes in civil, electrical and mechanical engineering. His subject was "Some Business Problems of the Motive Department."

Mr. L. R. Pomeroy, Sales Agent of the Forge Department, Camoria Iron Works, recently addressed the Senior students in Mechanical Engineering of Purdue University. A very complete description was given of the character and significance of the "Coffin Process" as employed by the Cambria Co. in making axles, crank pins and similar forgings. The lecture was illustrated by means of charts and diagrams.

The World's Shipbuilding in 1897.

According to a summary issued by Lloyd's Register of British and Foreign Shipping there was an aggregate increase during 1897 in the tonnage of the world's merchant marine of 619,000 tons. The total output of the world, exclusive of warships, is placed at about 1,331,000 tons (1,202,000 steam and 129,000 sail); but losses, etc., during the year amounted to 712,000 tons (316,000 steam and 396,000 sail), so that the net increase as above given was about 619,000 tons. There was a net increase in steam tonnage during the year of about 886,000 tons, but against this there was a net decline in sailing vessel tonnage of 267,000 tons. During the year, exclusive of warships, 591 vessels, of 952,486 tons gross (viz., 545 steamers, of 924,382 tons, and 46 sailing vessels, of 28 104 tons), were launched in the United Kingdom. The warships launched at both government and private yards amount to 48, of 95,465 tons displacement. The total output of the United Kingdom for the year, therefore, was 639 vessels, of 1,047,951 tons.

In reviewing shipbuilding operations in other countries for the year, the summary states that there were built 253 steamers, of 278,443 tons, and 146 sailing vessels, of 100,995 tons, in addition to 42 war vessels, of 133,435 tons displacement. Among foreign countries, the three leading places are held by Germany (140,000 tons), United States of America (87,000 tons), and France (49,000 tons). These figures do not include tonnage of war vessels. Included in the figures for Germany are three steamers of more than 12,000 tons each. Kaiser Wilhelm der Grosse, 14,349 tons, gross; Kaiser Friedrich, 12,500 tons, gross; Pretoria, 12,500 tons, gross.

Of the tonnage reported for the United States, about 60 per cent. does not affect the general commerce of the world, but is intended exclusively for service on the Great Lakes. These vessels are being built larger every year; three of the steamers built in 1897 are upward of 4,000 tons each, besides seven sailing barges, ranging between 3,180 and 3,800 tons.

Without the Slightest Exertion.

One of the longest trains of loaded cars ever hauled in the South went over the South Carolina & Georgia road last Tuesday. The train was made up of 70 box cars loaded with fertilizers, and it was hauled by a locomotive built by the Richmond Locomotive Works. The test was successful in every particular, the engine moving off without the slightest exertion.—*Exchange.*

The R. P. I. Alumni Association of New York.

Last Friday night the R. P. I. Alumni Association of New York had its annual dinner at Delmonico's. The attendance was large, probably larger than ever before. Mr. Joseph M. Knapp, President of the Association, was chairman and toastmaster. The speakers were President Peck, of the Institute; P. C. Ricketts, O. F. Nichols, H. G. Prout, Lewis Nixon, L. L. Buck, Professor Mason and George A. Just. Of course an R. P. I. Alumni dinner attracts a distinguished group of men; that goes without saying, and especially so in the city of New York, where so many of the most eminent engineers of the country have gathered.

A Trainload of Reindeer.

The War Department has ordered from Norway 530 reindeer for use on the government Klondike relief expedition. The contract for transporting the reindeer and their 87 Lapp attendants from New York to Seattle has been awarded to the Pennsylvania Railroad. The cars must go through from New York to Seattle without the transfer of the deer, freight or attendants, unless in case of accident, and the 87 attendants and two representatives of the War Department are to be transported free. Twenty-five stock and six box cars are to be furnished by the railroad company at $286.72 a car, and two tourist sleepers and two freight cars, fitted for cooking purposes, are to be furnished free. The trip is to be made on regular passenger-train time.

The Railroad Supply Men.

A circular has been issued by the Standing Committee of Railway Supply Men with regard to matters for the 1898 conventions. As is known, the M. C. B. convention meets first on Wednesday, June 15, and the second convention will follow the other with as little interruption as possible, and the two will probably wind up within a period of eight days. Congress Hall has been selected as the headquarters. The Standing Committee has arranged to have the rear veranda and the court of Congress Hall put at the disposal of the Committee, for exhibitors, without charge. The hotel will furnish steam from its own boiler plant and a pipe will be run through the middle of the court overhead and connections can be made by exhibitors. Exhibitors desiring power will have to furnish the necessary connections themselves, also engines and motors. The Committee hopes that the installation of all exhibits will be completed by the evening of Tuesday, June 14. Applications for space and for any information should be addressed to Mr. Hugh M. Wilson, Secretary of the Committee, 1,650 Monadnock Block, Chicago.

A Pan-American Fair.

Mr. Charles R. de Freest, formerly Secretary of the Board of Railroad Commissioners of New York State, has been appointed to the position of Manager of the Bureau of Publicity and Promotion for the Pan-American Exposition to be held at Niagara Falls, N. Y., commencing in May, 1899.

This is to be a Commercial and Educational Fair showing a century of progress on the American Continent, and its aim is to aid in promoting intercourse and trade between American Republics.

Mr. de Friest is now on his way to Washington in the interests of the fair, and will endeavor to secure an appropriation for a government exhibit.

New York Railroad Commissioner.

The Railroad Committee of the New York State Senate, on Feb. 2, decided to report favorably for confirmation the nomination of Frank M. Baker, of Owego, to be Railroad Commissioner.

Albemarl & Chesapeake Canal Co.

At a meeting of the stockholders held in Norfolk, Va., Feb. 5, Robert M. Cannon was elected President, succeeding Frank Weld, resigned, and Warren G. Elliott, President of the Wilmington & Weldon and Wilmington, Columbia & Augusta, which are parts of the Atlantic Coast Line, was elected a Director, succeeding W. S. Brown, of Erie, Pa., who declined to serve.

American Syndicate in Honduras.

Vice-Consul Bernard, at Tegucigalpa, has informed the State Department at Washington of the provisions of a contract entered into between the Honduras government and citizens of the United States, with reference to building and operating a railroad from Puerto Cortez, on the Atlantic coast, south about 200 miles by way of Comayagua to the Bay of Fonseco, on the Pacific coast. The government grants to the syndicate the railroad now in operation from Puerto Cortez to La Pimienta, 30 miles. For the extension, a grant of 100 ft. on either side of the line is given together with five square miles of public land contiguous to the road in alternate sections for every mile of railroad built. Several branch roads are included in the concession, including one to Tegucigalpa. The company is to use, without charge, all materials necessary for the road found in government lands, and has the right to all minerals found in the lands conceded, so far as this does not interfere with acquired rights of other parties.

Five miles of road must be built within the first year; 25 miles at the end of the second year; 50 miles at the end of the third year, and the road must reach Comayagua at the end of the fourth year, and be entirely completed at the end of the sixth year. If the company fails to comply with these conditions, it must pay the government 15 per cent. of the gross receipts of the line until the conditions are fulfilled. Government officials and mail are to be transported free of charge. Bonds may be issued not to exceed $20,000 in gold per month. At the end of 75 years, the government will have the right to purchase the road, with a similar option at the end of each five years following, and at the end of 99 years the entire property reverts to the state.

The syndicate undertakes to liquidate the public debt of Honduras and offices for this purpose will be opened in New York, London and Paris. Bonds are to be issued for one-fourth the original debt to run for 25 years, and bear interest in gold at 1½ per cent. A bank is to be established under the name of the Commercial Bank of Honduras, with a minimum capital of $500,000 in gold. This bank is to be the financial agent of the government and the depository of national funds, and will take control of the customs of the country. The government promises not to change the tariff so as to reduce the revenue for 15 years. The bank is to pay 1,000,000 pesos (about $500,000) to the government each year, a certain per cent. of which is to be applied to the payment of new bonds. There is to be no tax on the railroad or capital, and the syndicate is to equip one or more vessels to guard the coast and to prevent smuggling.

The officers and directors of the syndicate are: Chauncey M. Depew, President, and W. Seward Webb, John Jacob Astor, Benjamin F. Tracy, J. G. McCullough, Frederick B. Jennings, George S. Scott, Nathaniel A. Prentiss, Charles McVeigh and Melville E. Ingalls, Jr., directors. The agents for the syndicate in New York are Henry L. Sprague and W. S. Valentine.

LOCOMOTIVE BUILDING.

It is rumored that the Great Northern will soon be in the market for locomotives.

It is rumored that the Chicago Great Western will be in the market for locomotives soon.

It is rumored that the Indiana, Illinois & Iowa is in the market for several locomotives.

The Mexico, Cuernavaca & Pacific has ordered two locomotives from the Brooks Locomotive Works.

The Kansas City Belt Ry. is in the market for two switching locomotives, the order to be placed soon.

The Minneapolis & St. Louis has ordered four six-wheel switching locomotives from the Baldwin Locomotive Works.

The Richmond Locomotive & Machine Works are building two eight-wheel connected locomotives for the Mississippi River & Bonne Terre.

The Southern Indiana, to be known as the "Bedford Route," has received the three new passenger engines built by the Baldwin Locomotive Works. The three switching engines owned by the Bedford Belt road will be supplied with pony trucks under the front ends to steady them when running at high speed, and will be used as freight engines.

The Baldwin Locomotive Works have just completed four locomotives for the Soudan Railway (Egypt). They have 15 × 24-in. cylinders and are similar in general dimensions, weight, heating surface, etc., to the 18 built for the Japanese government railroads and the 12 built for the Sanyo Railway, which have been noticed in recent issues.

The St. Louis & San Francisco has ordered from the Baldwin Locomotive Works 10 10 wheel locomotives, of which five will be single expansion with 20 × 24 in. cylinders and five Vauclain compounds with 15 × 24 and 25 × 24 in. cylinders. It is estimated that they will weigh about 140,000 lbs. and will have about 112,000 lbs. on the driving wheels. They will have wagon-top boilers 60 in. in diameter, fireboxes 120 in. long × 41 in. wide, 2,160 sq. ft. of heating surface, driving wheels 63 in. in diameter, tenders of 4,000 gals. capacity. The specifications include Tennessee charcoal bloom staybolt iron, Vauclain wrought center steel-tired engine truck wheels, Westinghouse outside equalized air brakes on all driving and tender wheels, Magnesia boiler covering, Trojan couplers and steel-tired tender wheels.

CAR BUILDING.

The Rainey Coal Co., of Cleveland, is in the market for 300 coal cars.

The Kansas City, Memphis & Birmingham is in the market for 50 coal cars.

The Laconia Car Co., Laconia, N. H., is building three cars for the Cutting Car Co.

The Missouri Car & Foundry Co., St. Louis, is building 50 cars for Wells, Fargo & Co.

It is reported that the Illinois Central will build 100 freight cars at its own shops at Chicago.

The Merchants' Despatch Transportation Co. is building 145 refrigerator cars at its own shops.

The Youngstown Car Works, Youngstown, O., are building five cars for Struthers, Wells & Co.

The Nichols Chemical Co , New York, is having three cars built by the Wells & French Co., of Chicago.

The Milton Car Works (Murray, Dougal & Co.), Milton, Pa., are building 10 cars for the S. P. Shotter Co.

The Boston Elevated Railroad, which recently ordered 100 open street cars, is now asking bids on 50 closed cars.

The Toledo & Ohio Central, one of the Ohio Central lines, is in the market for 800 coal cars, for which orders will be placed soon.

We are officially informed that there is no foundation just now for the report that the Kansas City, Pittsburgh & Gulf will order 300 coal cars, although there may be later.

The Missouri Car & Foundry Co., St. Louis, Mo., is building 50 cars for the Shreveport & Red River Valley Railroad. We noted some time ago that this company was in the market for cars.

As previously mentioned in this column, the Atchison, Topeka & Santa Fe is building about eight freight cars per week, of various types, at the Topeka shops, to fill vacant numbers, but we are informed officially that there is nothing in the recent reports that 1,000 freight cars will be ordered.

The Chicago, Rock Island & Pacific has ordered from the Rodger Ballast Car Co. 25 "Standard" 60,000-lb. capacity ballast cars and one standard distributing car; these cars are to be equipped with Westinghouse air-brakes, Janney couplers, National Hollow brakebeams and Rock Island malleable iron center plates and dead blocks. They are to be delivered April 1.

Last week we noted the Missouri Pacific order with the Missouri Car & Foundry Co., of St. Louis, for 500 new coal cars, to be delivered as soon as they can be constructed. The dimensions will be: Total length inside end boards, 34 ft. 3 in.; width, 8 ft. 5¼ in.; height of side boards, 3 ft. 6 in.; length of car over buffers, 35 ft. 7¾ in.; length over couplings, 37 ft. 11 in.; height from top of rail to center of coupler (empty car), 2 ft. 10 in.; height from top of rail to end sill (empty car), 3 ft. 5 in. The cars will be equipped with Missouri Pacific standard automatic steel couplers, Westinghouse air-brakes, American Steel Foundry Co.'s bolsters, National Hollow brakebeams, Missouri Pacific standard combination journal box, adapted to receive M. C. B. wedge for journals with collars and stop wedge for collarless journals. Timbers to be used throughout on cars to be of yellow pine. Intermediate sills will be 4¾ in. × 10 in. and side sills 4¾ × 14 in.

The dimensions of the 20 tourist sleeping cars ordered by the Minneapolis, St. Paul & Sault Sainte Marie from the Pullman Co. last week and noted in this column at the time are: length over end sills, 56 ft.; width over side sills, 9 ft. 10¼ in. The outside sheathing will be cherry, with natural wood finish, and the inside finish will be birch throughout, the sashes double, birch inside and cherry outside. There will be upper and lower berths, the seats to be upholstered with curled hair and covered with morocoline. There will be kitchens equipped with "Tourist" ranges, smoking-rooms, buffet tables and toilet-rooms with marble wash-stands. All trimmings will be of bronze. The special equipment will include Westinghouse air-brakes and train signals, railroad company's standard four-wheel trucks, 33 in. cast wheels, inside hung brakes, National hollow brakebeams, Pickering springs and M. C. B. 4¼ in. × 8 in. journals, with railroad company's boxes and brasses, Pullman wide vestibules, standard steel platforms, Baker heaters with Consolidated Car Heating Co.'s commingler system of steam heat, Pullman's anti-telescoping device in ends of cars and Adams & Westlake double center lamps.

The Mahoning Valley Electric Railroad is in the market for a small number of closed cars to be 36 ft. 6½ in. long, mounted on double trucks.

In our last issue we noted the fact that the Metropolitan Street Railway Co , of New York City, had given a contract to the J. G. Brill Co., Philadelphia, for 200 open cars. These will be 37 ft. 4. in. over all and be equipped with G. E. 1,000 motors. Brill wrought iron angle bumpers, Pitts's steel extension gates, Sterling register connections, brakes and sand boxes, Pantasote curtains, Acme curtain fixtures, Jones & Laughlin special cold rolled steel axles 4 in. in diameter, New York Car Wheel Works Broadway standard wheels, Lappin brake-shoes, French springs and Sterling truck fenders.

BRIDGE BUILDING.

Buffalo, N. Y.—Assemblyman Hill has introduced a bill for an appropriation for a bridge over Black Rock Harbor, Ferry street.

Cleveland, O.—Plans are now being prepared in the office of the city engineer for a bridge across Waverly avenue at Edgewater Park.

Council Bluffs, Ia.—The matter of building a bridge over the creek at Twenty-eighth street will come up before the City Council in the near future.

Cumberland, Md.—The Cumberland & Pennsylvania will build a new bridge over Will's Creek, just beyond the Narrows.

Clyde, N. Y.—The Board of Supervisors (Wayne County) are seeking to have a bill passed in the Assembly making an appropriation for a bridge over the Seneca River.

Detroit, Mich.—Mr. John Bell, Chief Counsel for the Grand Trunk, gives notice that an application will be made to the Dominion parliament this session for an act to incorporate the Windsor & Detroit Union Bridge Company for the purpose of constructing a bridge between a point at or near Windsor, and a point at or near Detroit. Also with power to the company to amalgamate with a company incorporated or to be incorporated under the laws of the state of Michigan for the purpose of the construction and working and management of the bridge. The reader will remember that few great bridge schemes have been more persistently pushed or more resolutely fought than this one.

Dudley, Wis.—A new bridge will be built over the Prairie River, in Dudley, Lincoln County.

Humboldt, Ia.—It is stated that the Board of Commissioners (Humboldt Co.) ask for bids till April 5 for building bridges for 1898.

Louisiana, Mo.—A bill has passed a second reading in the Senate and was referred to the Committee on Commerce for a bridge over the Mississipi at Louisiana. The following names appear in the bill. James O. Broadhead, David A. Ball, W. J. Daugherty, John W. Robertson, R. H. Goodman, James McCane, J. G. Adams and C. B. Dustin.

Montreal, P. Q.—Preparations are under way for beginning work on the bridge across the Ottawa River, from Nepean Point, in Montreal, to the city of Hull. The Dominion Bridge Co., of Lachine, will build the superstructure. The bridge will be about 1,300 ft. long and will carry two steam railroad tracks and two electric railroad tracks and a 16 ft. roadway on each side. The total cost is estimated at about $750,000.

Mount Vernon, N. Y.—There is a prospect that the city of Mount Vernon and the town of Pelham Manor will build the bridge, previously reported, over the Hutchinson River. An act of Legislature allows $45,000 with which to build the bridge, approaches, and to acquire rights of way.

Nebraska City, Neb.—The County Commissioners (Otoe County) are asking for bids for bridges to be built in the county from March 4, 1898, to March 4, 1899.

New Lisbon, O.—Three bridges were washed out on Brush Creek, Columbiana County, two miles north of Winchester. Much damage has been done to other bridges in the county.

New Whatcom, Wash.—It is stated that the Board of County Commissioners has applied to the Secretary of War for permission to build a bridge over Noosack River.

Omaha, Neb.—The question of building a foot bridge across the railroad tracks at the foot of N street is being freely discussed. The stock yards managers will probably give full particulars regarding the building of same.

Otisco, N. Y.—Assemblyman W. G. Cottle has introduced a bill in the Assembly appropriating $10,000 for a bridge across Otisco Lake, connecting the towns of Otisco and Spofford.

Pocahontas, Ark.—The Pocahontas Bridge & Terminal Railway Co.'s bill to authorize the bridge across the Black River, in Randolph County, has passed the second reading in the Senate and was referred to the Committee on Commerce.

Quincy, Ill.—The Chicago, Burlington & Quincy, in asking the city of Quincy for certain rights of way, renews its assurance that an addition will be made to the railroad bridge now building that will accommodate wagon traffic.

St. Louis, Mo.—The Board of Officers of Engineers, U. S. A., appointed to consider and report upon the plans for the proposed bridge across the Mississippi River between St. Louis and St. Clair County, Ill., will hold a public meeting in the Southern Hotel, St. Louis, Feb. 17. Mayor M. M. Stephens is one of the promoters of the bridge.

Santa Rosa, Cal.—J. B. Garrett has petitioned for a bridge over Midshipman's Slough, near Petaluma. The question was to come up before the board on Feb. 11.

Turin, N. Y.—Assemblyman A. L. Clark has introduced a bill appropriating $10,000 for a bridge across Black River at Pratts' Landing, between Greig and Turin, Lewis County.

Yankon, S. Dak.—The time for building the bridge across the Missouri River at Yankon has been extended by act of Congress four years from June 22, 1898.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, quarterly, common and preferred, 1¾ per cent., payable March 1.

New York, Chicago & St. Louis, first preferred, 2 per cent , payable March 1.

Norfolk & Western, preferred, 1 per cent., payable Feb. 23.

Piedmont & Cumberland, 2 per cent., payable March 15.

St. Paul & Duluth, preferred, 2½ per cent., payable March 1.

Waynesburg & Washington, 2½ per cent., payable March 15.

Cleveland & Pittsburgh, quarterly, 1¾ per cent., payable March 1.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Civil Engineers* meets at the House of the Society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds its formal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7:30 p. m.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Chicago Electrical Association* meets at Room 7137 Monadnock Building, Chicago, on the first and third Fridays of each month, at 8 p. m. J. R. Cravath, Secretary.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month, except June, July, August and September.

The *Denver Society of Civil Engineers* meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Engineers' Club of Columbus, (O.)*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m., except during July and August.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Engineers' Society of Western Pennsylvania* meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7:30 p. m.

The *Locomotive Foreman's Club* meets every second Tuesday in the clubroom of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *New England Railroad Club* meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

The *New York Railroad Club* meets at 12 West Thirty first street, New York City, on the third Thursday in each month, at 8 p. m.

The *North-West Railway Club* meets on the first Tuesday after the second Monday in each month, at 8 p. m , the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *St. Louis Railway Club* holds its regular meeting on the second Friday of each month, at 3 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is secretary.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *Western Society of Engineers* meets in its rooms on the first Wednesday of each month, at 8 p. m., to hear reports, and for the reading and discussion of papers. The headquarters of the Society are at 1736–1739 Monadnock Block, Chicago.

Western Foundrymen's Association.

The next meeting of the Western Foundrymen's Association will be held at the Great Northern Hotel, Chicago, Wednesday evening, Feb. 16. Mr. Eugene W. Smith will read a paper entitled "Mechanical Changes in Mixtures of Cast Iron." This paper and the paper presented at the January meeting by Major Malcolm McDowell, "The Value of Metalloids in Cast Iron," will be discussed.

New England Railroad Club.

The regular monthly meeting of the Club was held at Pierce Hall, Boston, on the evening of Feb. 8. A paper by M. E. Harlow, New England Manager of the Ingersoll-Sergeant Rock Drill Co., on "Compressed Air," was read and discussed. Thirty-two new members were elected. The annual meeting of the Club will be held March 8.

St. Louis Railway Club.

A meeting of the St. Louis Railway Club was held Friday, Feb. 11, at the Southern Hotel, St. Louis. Mr. Richard A. Smart, Instructor in the Mechanical Laboratory of Purdue University, read a paper, "The Performance of a Four-Cylinder Locomotive." This is a stationary piece of apparatus mounted in the main laboratory, consisting of the cylinders, moving parts and first driving wheels of a small Vauclain compound locomotive: steam is supplied from stationary boilers. This apparatus was described and illustrated in the *Railroad Gazette*, Sept. 20, 1895, at which time the results of the first tests made were given in full. Since that time a very careful study of the changes, which take place within the cylinders of this type of engine, has been made, and Mr. Smart's paper was based principally upon the later experiments. The papers announced for discussion were "Railway Clubs," "Shop Etchings" and "English Railway Practice," which were presented at former meetings.

American Street Railway Association

The Executive Committee of the American Street Railway Association met in Boston on Jan. 26 to arrange for the annual convention of the Association to be held in Boston this fall. It was decided to fix the date of the convention from Sept. 6 to 9, inclusive, it being impossible to arrange for the meeting in October, as customary. The exhibits will be placed in the Mechanics' Institute, where 60,000 squar foot of space and plenty of power will be available. The charge for the space in the hall will be 10 cents per square foot, as formerly. The hall is near the tracks of the Boston & Albany and the New York, New Haven & Hartford, so that the heavy machinery can be easily placed. Mr. C. S. Clark, 8 Oliver street, Boston, is Chairman of the Exhibit Committee. Mr. R. S. Goff, President of the Globe Street Railway Co. of Fall River, is Chairman of the Local Committee. The following subjects have been announced for papers at the annual convention, subject to possible changes: "Inspection and Testing of Motors and Car Equipment by Railroad Companies." "How to Care for the Return Current." "Comparative Earnings and Economy of Operation Between Single and Double Truck Cars for City Use." "Carrying of United States Mail Matter on Street Railroads." "Underground Electric Roads—Their Construction and Management." "To What Extent Should Street Railroad Companies Engage in the Amusement Business." "Maintenance and Equipment of Electric Cars."

Engineers' Club of St. Louis.

The 466th meeting was called to order at 8 p. m. Feb. 2, with President Bryan in the chair. Thirty-six members and 16 visitors were present. The Secretary announced the following programme of papers for the year 1898:

Jan. 5, "A Historical Sketch of Street Railways," R. M. McCulloch.
Jan. 18, "Experiments with a New Machine for Testing Materials by Impact," S. Bent Russell.
Feb. 2, "The Diesel Motor," Col. E. D. Meier.
Feb. 16, "Recent Advances in Electric Railway Practice," R. McCulloch.
March 2, "Recent Improvements in Steam Ferries," Wm. H. Bryan.
March 16, "The St. Louis Coliseum," E. W. Sterne.
April 8, "U. S. Dredge Boats, Epsilon and Zeta," Edward Flad.
April 20, "A Modern Telephone Exchange," Fred. E. Bausch.
May 4, "Filtration of Water," M. L. Holman.
May 18, "The Recently Discovered Oil Fields of Texas," Thos. D. Miller.
June 1, "Ethics of Engineering," "Report of the Committee on Smoke Prevention," Chas. C. Brown.
Sept. 21, "Modern Central Lighting Stations," H. H. Humphrey.
Oct. 5, "Repairs to the Mill Creek Sewer," B. H. Colby.
Oct. 18, "The Streets of a Modern City," A. N. Milner.

Nov. 2, "Roadways," Thos. H. Macklin.
Nov. 16. "Concrete Walls," Robert Moore.
Dec. 7, annual meeting, reports of officers and committees.
Dec 21, annual dinner.

The paper of the evening by Col. E. D. Meier, on "The Diesel Motor" was then read. The development of heat engines from their invention was traced, and the causes for the universal adoption of the steam engine as a heat motor were analyzed. The writer stated that the steam engine had now reached the limit of its efficiency, and gave the reasons for its low efficiency as a transformer of energy. Gas and oil engines were described and their merits discussed. The principles on which depend the action of the Diesel motor were given, with a description of the machine as built in Germany. Data was given as to the relative efficiency of the Diesel motor as compared with the steam engine. The paper was illustrated by drawings, cuts and photographs.

The discussion was participated in by Messrs. Bryan, Kinealy, Robert Moore, Johnson and Freeman.

PERSONAL.

—Mr. E. S. Nashburn, formerly General Freight Agent of the Cleveland, Cincinnati, Chicago & St. Louis, has been elected President of the Kansas City Railway Company.

—Mr. L. H. Wheaton, Superintendent of the Coast Railway of Nova Scotia, was recently presented on behalf of the business men of Yarmouth, N. S., with a marble clock and a gold-headed cane.

—Mr. A. P. Wilder, Manager of the Missouri & Kansas Car Service Association, died at his home in Topeka, Kan., Feb. 3, at the age of 66. He was at one time Car Accountant of the Atchison, Topeka & Santa Fe.

—Mr. Sam J. Barclay, who recently resigned as General Agent of the Chicago Great Western, at Butte, Mont., has been appointed Traffic Manager of the Alaska-Klondike Transportation, Mining & Mercantile Co., with headquarters at 616 Ashland Block, Chicago, Ill.

—Mr. E. P. Huston, late Receiver of the Peoria, Decatur & Evansville, died at the residence of his father, at Paris, Ill., Feb. 6, at the age of 57. Mr. Huston was, at one time, Vice President of the Evansville & Terre Haute, and President of the Bank of Commerce, at Evansville, Ill.

—Mr. Augustus Sherrill Whiton, a Civil Engineer, died in New York City, Feb. 7, at the age of 78. Mr. Whiton was in charge of the construction of the branch of the Erie Railroad between Piermont and Goshen, N. Y. In 1857 he was General Superintendent of the Erie, and later became Agent in this country for a European rail company.

—Mr. Thomas Andrew Osborne, ex-Governor of Kansas, died suddenly at Meadeville, Pa., Jan. 4, at the age of 61. Mr. Osborne was a Director of the Atchison, Topeka & Santa Fe, and was on his way home to Topeka from New York, where he had been in attendance at a meeting of the Board. He was elected Governor of Kansas as a Republican in the sixties, and afterward served as Minister to Peru and Brazil.

—The retirement at the age of 71 is announced of Count Rudolph Cronstedt, for the last 10 years the head of the Swedish State Railroad administration. Count Cronstedt had been a railroad engineer from his youth, and had occupied very high positions for the last 35 years. As head of the State railroads he had given particular attention to introducing heavy rails (80 lbs. per yard), increasing the speed of passenger trains, securing greater safety in operation, and reducing fares. He is succeeded by C. F. T. Nordström.

—Col. S. F. Clark died at his home in Little Rock, Ark., Jan. 30, at the age of 79. In 1853 Colonel Clark was appointed a Commissioner to open books and solicit subscriptions to stock of the Cairo & Fulton and its branches, now the St. Louis, Iron Mountain & Southern. He was at one time Attorney for and a Director of the Little Rock & Fort Smith, which is now leased to the St. Louis, Iron Mountain & Southern, and, later, was its President. From 1875 to 1879 he was a Director of the Little Rock & Mississippi River Railway, which is now also a part of the St. Louis, Iron Mountain & Southern.

—Mr. Sigismund Low, a civil engineer of Pittsburgh, Pa., died at his home in Glenwood, Pa., Feb. 3. Mr. Low was born in 1825 in Germany. In 1848 he graduated from the Carlsruhe Polytechnic School. He was at one time Chief Engineer of the Pittsburg & Connellsville, and later became associated with the engineering department of the Northern Pacific. After being Chief Engineer of the Guanajuato Division of the Mexican Central for some time, he went back to Pittsburgh and became connected with the Baltimore & Ohio, which had absorbed the Pittsburgh & Connellsville. In 1849 he was one of Franz Sigel and Carl Schurz's associates in the revolutionary movement in Germany and was sentenced to be shot. Mr. Low was one of the founders of the Pittsburgh *Volksblatt*.

ELECTIONS AND APPOINTMENTS.

Atlantic Coast Line.—W. J. Craig, formerly General Manager of the Charleston & Western Carolina, which was recently purchased by the Atlantic Coast Line, has been appointed General Freight and Passenger Agent of both lines, and his former office on the Charleston & Western Carolina has been abolished. The change was made Feb. 1.

Atchison, Topeka & Santa Fe.—At a meeting of the Directors, New York City, Feb. 1, E. D. Kenna, General Solicitor, was elected First Vice-President. He will continue the duties and title of General Solicitor and will perform such other duties as may be assigned to him; and Paul Morton, heretofore Third Vice-President, was elected Second Vice-President in addition to his duties in charge of the commercial affairs. The headquarters of both are at Chicago, Ill.

Baltimore & Ohio.—G. W. Squiggins has been appointed City Passenger Agent, with headquarters at Pittsburgh, Pa., succeeding C. E. Gregory.

Baltimore & Ohio Southwestern.—Jesse Webb, heretofore Railroad Editor of the Cincinnati *Commercial Tribune*, has been appointed Advertising Agent, with headquarters at Cincinnati, O.

Buffalo, Attica & Arcade.—W. W. Bell has been elected Vice-President and Treasurer, with headquarters at Bradford, Pa.

Canada Atlantic.—James Ritchie has been appointed General Eastern Agent, with headquarters at 193 Washington street, Boston, Mass., succeeding Royal Whiton. George J. Harris, heretofore Agent of the Ogdensburg Transit Co. at Chicago, has been appointed General Western Agent of the Canada Atlantic and the Canada Atlantic Transit Co., with headquarters at 6 Sherman street, Chicago, Ill.

Canada Southern.—Earl M. Cary has been appointed Traveling and Contracting Agent, with headquarters at Cincinnati, O., succeeding Stuart A. Allen, resigned. His appointment took effect Feb. 1.

Carolina Midland.—Isaac W. Fowler has been appointed General Manager, with headquarters at Barnwell, S. C. The appointment took effect Dec. 23.

Center & Teneha.—The officers of this recently incorporated company, referred to in another column, are as follows: President, A. R. Chandler; Vice-President, A. B. Knight; Secretary, R. L. Parker; Treasurer, J. C. Rogers; General Superintendent, S. T. Fleshman. Principal office, Center, Tex.

Central of Georgia.—W. D. Hammett has been appointed Soliciting Freight Agent, with headquarters at Macon, Ga., succeeding John C. Carlisle, promoted. (See this column for last week.)

Charleston & Western Carolina.—The offices of Auditor, E. W. Miller, and General Manager, W. J. Craig, of the Charleston & Western Carolina, which was recently purchased by the Atlantic Coast Line, have been abolished by President H. Walters of the Atlantic Coast Line.

Chesapeake & Ohio.—A. P. Gilbert has been appointed Traveling Freight Agent, with headquarters at Richmond, Va., succeeding Alfred S. Cary, who has been appointed Soliciting Agent at Richmond, Va. Mr. Gilbert's territory embraces the main line, Richmond west to and including Gauley, W. Va., the James River Division west of Lynchburg and branch lines intermediate.

Chicago & Alton.—H. H. Boyd has been appointed Traveling Freight Agent, with office at Buffalo, N. Y.

Chicago & Northwestern.—J. P. Coleman has been appointed Civil Engineer of the Madison Division, with headquarters at Baraboo, Wis., succeeding H. W. Battin, whose promotion was noted in this column last week.

Chicago, Burlington & Quincy.—W. A. Lalor has been appointed Assistant General Passenger Agent, with headquarters at Chicago, Ill.

Chicago Great Western.—A. B. Moseley, heretofore Cashier of the Salt Lake office of the Denver & Rio Grande Express, has been appointed to the new office of Traveling Freight Agent in Salt Lake City, Utah. (See this column for last week.)

Chicago Junction Railway.—The officers of this consolidated company, forming a Belt Line around the City of Chicago, are as follows: President, John A. Spoor; Vice-President, James H. Ashley; Traffic Manager, S. S. Whitehead; General Superintendent, Richard Fitzgerald; Treasurer, L. J. Dudley.

Chicago, Milwaukee & St. Paul.—Robert Pott has been appointed Traveling Passenger Agent, with headquarters at Pittsburgh, Pa.

Chicago, Rock Island & Pacific.—F. W. Caldwell has been appointed Traveling Passenger Agent, with office at Omaha, Neb., succeeding A. C. Turpin, who has been transferred.

Choctaw, Oklahoma & Gulf.—William Noble has been appointed Emigration Agent, with headquarters at South McAlester, I. T.

Cincinnati, Hamilton & Dayton.—Henry Caper, heretofore Agent at College Corner, O., has been appointed Traveling Passenger Agent, with headquarters at Cincinnati, O. The appointment took effect Feb. 1.

Cleveland, Akron & Columbus.—John H. Sample, heretofore Acting General Superintendent, has been appointed General Superintendent. His headquarters are to be at Cleveland, O.

Cleveland, Cincinnati, Chicago & St. Louis.—Edward F. Cost has been appointed Freight Traffic Manager, with headquarters at Cincinnati, O. The office of General Freight Agent has been abolished. The appointment and change took effect Jan. 27.

Danville & Mt. Morris.—M. F. Lapp, heretofore Acting Superintendent, has been appointed Superintendent, with headquarters at Danville, N. Y. The appointment took effect Jan. 1.

Davenport & Rock Island Bridge Railway & Terminal Co.—At the annual meeting of this company, held at Davenport, Ill., Jan. 18, the Board of Directors was reduced from 13 to 7, and the stockholders elected the following Directors: H. B. Schuler, D. T. Schuler, C. H. Guernsey, of Chicago; C. H. Deere and H. A. Aimsworth, of Moline; J. R. Lane, of Davenport, and Frank P. Blair. At the annual meeting of the Directors, held later, the following officers were elected: President, H. B. Schuler; Vice-President and General Manager, F. P. Blair; Secretary and Treasurer, D. T. Schuler.

Delaware River Railroad & Bridge Co.—At the annual meeting of this company, held at Merchantville, N. J., A. O. Dayton was elected as a Director. At a meeting of the Directors, held later, John M. Harding was elected Secretary, succeeding James R. McClure.

East St. Louis Connecting.—C. L. Leslie has been appointed Auditor of the Wiggins' Ferry Company, St. Louis Transfer Railway and the East St. Louis Connecting, with headquarters at 921 Security Building, St. Louis, Mo., succeeding H. E. W. Prichert, resigned.

Fitchburg.—C. A. Nimmo, heretofore Western Passenger Agent, has been appointed General Western Passenger Agent, with headquarters at Troy, N. Y.

Florida Central & Peninsular.—W. F. Coachman has been appointed to the new office of Assistant General Freight Agent, with headquarters at Jacksonville, Fla.

Freemont, Elkhorn & Missouri Valley.—F. M. Marsh has been appointed Chief Engineer to succeed John B. Berry, who has resigned to become Chief Engineer of the Union Pacific.

Georgia Southern & Florida.—D. G. Hall, heretofore Traveling Passenger Agent, has been appointed General Agent, with headquarters at Atlanta, Ga.

Gulf, Louisiana & Great Northern.—At the annual meeting, held at Alexandria, Feb. 3, the following officers and Directors were elected: President and General Manager, Joseph J. Waitz; Vice-President, A. L. Atkins; Secretary, C. F. Rock; Treasurer, H. D. Brack; Auditor, C. H. Teal. The other Directors are James Williams, H. A. Groat, J. F. Oliphant, Julius Kaase and B. F. Olden.

Hillsboro.—The new officers of this company are as follows: Vice-President, C. T. Whistler; Superintendent, H. H. Richards. The offices of both are at Hillsboro, O. E. F. Gray has been appointed General Freight Agent, with headquarters at Cincinnati, O.

Holyoke & Westfield.—At the annual meeting of this company, whose line is leased to the New York, New Haven & Hartford, recently held at Holyoke, Mass., the following Directors were elected: W. B. C. Pearsons, George W. Prentiss, E. W. Chapin, John D. Walsh, J. K. McCarthy, James A. Allyn, J. Lewis Perkins and William Clark.

Kansas City, Pittsburgh & Gulf.—H. C. Archer, heretofore joint City Ticket Agent of the Kansas City, Pittsburgh & Gulf and Houston, East & West Texas roads at Galveston, Tex., has been appointed Traveling Passenger Agent, with headquarters at Galveston, Tex.

John C. Loverein has been appointed General Agent of the Omaha, Kansas City & Eastern and the Kansas City, Pittsburgh & Gulf, at Quincy, Ill. The appointment is effective Feb. 15. B. F. Wilson has been appointed Commercial, Freight and Passenger Agent, with headquarters at Joplin, Mo. J. C. Mow has been appointed Commercial Agent at Beaumont, Tex. Appointments effective Feb. 3. E. H. Shaufler has been appointed Commercial Agent of the Omaha, Kansas City & Eastern and the Kansas City, Pittsburgh & Gulf, at Omaha, Neb., succeeding George M. Entrikin, transferred to Kansas City. J. R. Snodgrass has been appointed Live Stock Agent of the Kansas City, Pittsburgh & Gulf, with headquarters at Maryville, Mo.

Lake Shore & Michigan Southern.—J. P. Hayden, heretofore Traveling Auditor of the Lake Shore & Michigan Southern, has resigned on account of ill-health. The resignation took effect Feb. 1.

Mason City & Fort Dodge.—W. C. Tooney was recently elected President; his office is at St. Paul, Minn. J. C. McAnally has been appointed Ticket, Freight and Passenger Agent, with headquarters at Fort Dodge, Ia., succeeding G. L. McAlpine.

Mexican International.—Horace D. Goodale has been appointed Traveling Passenger Agent, with headquarters at Aguas Calientes, Mex., succeeding Joe Wright, whose resignation took effect Jan. 21. The appointment took effect Feb. 1.

Mexican National.—H. J. Falkenbach, heretofore Traveling Freight & Passenger Agent, with headquarters at Chicago, Ill., has been appointed Assistant General Passenger Agent, with headquarters in the City of Mexico. The appointment effective Feb. 1.

F. W. Boebinger has been appointed General Foreman of the San Luis Potosi, Mexico, shops (not San Luis Obispo, as reported by a contemporary), succeeding Frank Welboan.

Michigan Central.—S. K. Bigelow has been appointed Commercial Agent, with headquarters at Duluth. The appointment took effect Feb. 1, succeeding J. A. Ferguson, who resigned to become Agent for the North Shore Dispatch.

Mobile & Ohio.—Gen. James C. Clarke has resigned the Presidency, but, upon the request of the Board of Directors, has consented to serve as a Director of the road. Mr. Clarke has been President for the past 10 years.

New York Central & Hudson River.—At a special meeting of the Directors of this company, held in New York City, Feb. 4, two new directors were elected, George S. Bowdoin in place of Erastus Corning of Albany, and Ashbel Green, succeeding George C. Buell, of Rochester, who recently died.

James H. Brothers has been promoted to be Chief Clerk to W. D. Otis, General Roadmaster of the New York Central & Hudson River, succeeding Samuel Everson, who has been made Roadmaster of the Mohawk & Malone. (See these columns for Jan. 28.)

New York, Susquahanna & Western.—At a meeting of the Directors of this company, held in New York City, Feb. 3, Charles H. Coster, of the Banking House of J. P. Morgan & Co., was elected a Director.

Norfolk & Southern.—F. L. Nicholson has been appointed to the new office of Engineer of Maintenance of Way. He will report to the General Manager and confer with and aid the Division Superintendents. He will prepare and have charge of standard maps and descriptions of the real estate and structures, and keep such records pertaining to maintenance of way as shall be prescribed.

Norfolk & Western.—Frank B. Henrietta has been appointed Road Foreman of Engineers, with headquarters at Roanoke, Va. The appointment took effect Feb. 1. Mr. Henrietta was, at one time, foreman of the Cleveland, Cincinnati & St. Louis, in Columbus, O., and recently foreman of the same road at Linndale, O.

Northern of New Jersey.—At a recent meeting, held in New York City, Edward White was elected Treasurer, succeeding Arthur Trumbull, resigned. His office is at 21 Cortlandt street, New York.

North Shore Dispatch.—General Manager W. G. Mann of the new fast Freight Line has completed his appointments of Agents as follows: John G. Church, Boston; Storer F. Jones, New Haven, Conn.; F. P. Mogridge, Philadelphia; F. W. Fowkes, Philadelphia; W. H. Gomersall, Jr., New York; E. T. Hopkins, foreign freight, Produce Exchange, New York; W. H. Smith, grain agent, Produce Exchange, New York; Lucius Smith, E. B. F. A., 100 Wall street, New York; W. A. Higham, New York; L. Merritt, state agent, 207-208 Kirk Block, Syracuse; G. H. Stevens, Suspension Bridge; J. I. Mac Taggart, Westbound agent, Chicago; S. G. Tiffin, Milwaukee; C. F. Swisher, Minneapolis; T. J. McGeoy, Kansas City; R. F. Downing, import representative. J. A. Ferguson, heretofore Commercial Agent of the Michigan Central at Duluth, to be Agent at Detroit; J. P. Keys, heretofore with the West Shore, has been appointed Agent at St. Louis, Mo.; J. N. Templeton, Contracting Agent at Cincinnati, O. (For other appointments see this column for Jan. 28.)

Ohio Connecting.—At the annual meeting of this company, which is a branch of the Waynesburg & Washington, held in Pittsburgh, Pa., Feb. 1, Joseph Wood was elected President.

Omaha Bridge & Terminal Ry.—John R. Webster, heretofore Assistant General Manager and Secretary, has been appointed Vice-President and General Manager, succeeding Arthur S. Potter, resigned. (See these columns for last week.) J. Herschell Daniels, heretofore Acting Auditor, has been appointed Secretary, succeeding Mr. Webster. A. E. Stillwell, President of the Kansas City, Pittsburgh & Gulf, succeeds Mr. A. S. Potter in the Directory.

Oregon Short Line.—T. M. Schumacher has been appointed General Agent of the Freight Department, with headquarters at 121 Front street, San Francisco, Cal., and G. W. Hitchcock has been appointed General Pas

senger Agent, with headquarters at San Francisco, Cal. The appointments took effect Jan. 1.

Philadelphia & Reading.—H. H. Vaughan, whose resignation as Mechanical Engineer of the Great Northern at St. Paul, Minn., took effect Feb. 1, has been appointed Mechanical Engineer of the Locomotive Department of the Philadelphia & Reading, with headquarters at Reading, Pa.

Pittsburgh, Chartiers & Youghiogheny.—At the annual meeting of this company, held at Pittsburgh, Pa., Jan. 24, the following change in officers was made: Joseph Wood, President; E. B. Taylor, Vice-President; J. G. Robinson, formerly Vice-President, was elected Treasurer. The headquarters of all are at Pittsburgh, Pa.

Rio Grande Southern.—J. A. Edwards, heretofore General Foreman of the shops at Ridgway, Col., has been appointed Master Mechanic of the road, with headquarters at the same place. The appointment took effect Feb. 1.

Rome, Watertown & Ogdensburg.—James Sharpe has been appointed Traffic Agent, with headquarters at Chicago, succeeding John J. Hyland, resigned.

St. Louis & San Francisco.—B. F. Dunn, heretofore Traveling Freight Agent, has been appointed Traveling Freight and Passenger Agent. His headquarters are at Fort Smith, Ark., and the appointment took effect Feb. 1.

St. Louis Southwestern.—It is officially stated that G. M. Winstead, of Greenville, Tex., has not been appointed Soliciting Agent at Houston, Tex.

E. T. Smith has been appointed Paymaster, with headquarters at St. Louis, Mo., succeeding A. C. Bates, resigned.

Southern.—J. C. Moore, of Knoxville, Tenn., has been appointed Auditor of Disbursements, with headquarters at Washington, D. C., succeeding H. I. Bettis, who has been transferred.

Texarkana & Fort Smith.—At the annual meeting of the Directors of this company, which is a part of the Kansas City, Pittsburgh & Gulf, held at Texarkana, Ark., Feb. 3, Mr. Charles Snooks, of Texarkana, was elected Secretary and General Manager.

Union Pacific.—John B. Berry, Chief Engineer of the Fremont, Elkhorn & Missouri Valley, has been appointed Chief Engineer of the Union Pacific, succeeding G. H. Pegram, recently resigned. His headquarters are to be at Omaha, Neb.

S. A. Hutchison, heretofore General Traveling Passenger Agent, with headquarters at Omaha, Neb., has been appointed General Passenger Agent. The appointment took effect Feb. 1.

Vandalia Line.—A new office of Coal Inspector has been created, and William Reddie has been appointed to that office. He is to inspect all coal purchased for the Vandalia lines.

Washington & Franklin.—The Directors of this newly incorporated company, referred to in another column, are as follows: W. U. Brewer, President; Gen. John M. Hood, Congressman T. M. Machon, W. W. Patterson, of Scranton, Pa.; Jacob J. Miller, Franklin Miller and Otis Nicademus.

Waynesburg & Washington.—At the annual meeting of this company, which is a part of the Pennsylvania Company, at Pittsburgh, Pa., Feb. 1, Joseph Wood was elected President, succeeding the late John E. Davidson. Two new directors were elected at this meeting: Joseph Wood and Edward B. Taylor. At a meeting of the Directors, held later, J. J. Brooks was elected Vice-President.

Wheeling Bridge & Terminal Ry.—John A. Rutherfurd has been elected Vice-President, succeeding C. H. Coit. His office is in New York City.

Wilmington Seacoast.—At the annual meeting, held at Wilmington, N. C., Feb. 1, Charles W. Worth and James S. Worth were elected as Directors, succeeding B. G. Worth and S. H. Smith. At a meeting af the Directors, held later, James S. Worth was elected Secretary and Treasurer, and E. S. Latimer was appointed Traffic Manager, succeeding W. F. Toome.

Wisconsin Central.—J. A. Clock has been appointed General Agent, with headquarters at Portland, Ore., succeeding George S. Batty, resigned.

RAILROAD CONSTRUCTION,
Incorporations Surveys, Etc.

Arkansas Central.—At a recent meeting of the Board of Directors, it was voted to secure an amendment of the charter allowing an extension of the road from Paris, Ark., to Little Rock and Hot Springs. The road is now being built from Fort Smith, Ark., east to Paris, 44.5 miles. (See this column for Jan. 21.) N. B. Kendall, of Fort Smith, is General Manager.

Astoria & Columbia River.—It is officially stated that track laying is in progress at both ends of this line which is to extend from Astoria, Ore., along the southern bank of the Columbia River to Goble, a point on the Northern Pacific, 60.3 miles. Track laying is to be completed early in March, and the road ready for business 60 days later. T. H. Curtis, Astoria, Ore., is Chief Engineer. (See this column for Jan. 21.)

Augusta Southwestern.—This company has been incorporated in Georgia with a capital stock of $1,000,000, to build a line from Tennille southwest about 100 miles to Cordele. Notice of the organization of this company was given in this column for Oct. 15. James U. Jackson, of Augusta, Ga., is among those interested.

Canada Atlantic.—Application has been made to Parliament by this company for an act empowering the company to extend this line from a point near the Richeleu, in the County of Missisquai, east to the international boundary line, or for a similar extension in the counties of Brome, Stanstead or Compton, to form a connection with the railroad systems of the United States. Another extension asked for is from some point near the St. Lawrence River through the counties of Soulanges and Vandreuil, crossing the Ottawa River near the village of St. Anne, and thence to the City of Montreal.

Canadian Pacific.—Press reports state that Sir William Van Horne, President of this company, announces that he has given orders for the immediate building of a line from Toronto north to Sudbury, to connect with the lines of the company at that point.

Center & Teneha.—It is officially stated that this road, whose incorporation was noted in this column last week, is to build a line from Teneha, Tex., south 11 miles to Center, and that the line will probably be extended some 22 miles further. Surveys have been completed and four miles graded. All the contracts have been let. Fifty men are at work. The road is to be used for getting out pine, hard lumber, coal, oil and building stone. The officers are given in another column.

Chicago, Rock Island & Pacific.—Official statement is received that in connection with the Atchison, Topeka & Santa Fe, this company is building a short piece of track east of Atchison bridge, on the right of way of the Chicago, Burlington & Quincy Co., for the purpose of connecting its line, which was cut off several years ago by the Missouri River, with the Atchison bridge. After the connection is made the Chicago, Rock Island & Pacific will run its trains into Atchison, Kan., using the freight facilities of the Atchison, Topeka & Santa Fe at that place for freight business, and the Union Depot, in which the Chicago, Rock Island & Pacific has joint ownership, for the transaction of passenger business.

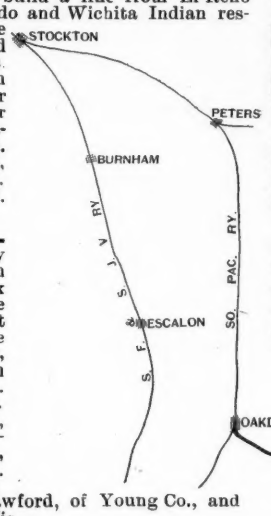
Choctaw, Oklahoma & Gulf.—The Bracey-Wells Construction Company, of Chicago, is reported to have obtained the contract for building the extension of this road from Wister, I. T., east 6½ miles to the Kansas City, Pittsburgh & Gulf. (See this column for last week.)

Cleveland, Cincinnati, Chicago & St. Louis.—The Crouch Construction Company, of Chicago, according to report, has been awarded a contract to build about one mile of track for this company in Andersonville, Ind., to the old gravel pit on the McCullough farm. The contract for grading has been sublet to R. G. Kirkpatrick, of Andersonville. It is further stated that the Crouch Construction Company will later remove the big hill above the tracks of the Cleveland, Cincinnati, Chicago & St. Louis at Andersonville.

Detroit & Lima Northern.—The Ferguson Construction Company, of New York City, has been awarded the contract for building an extension of the Columbus Northwestern from Bellefontaine southeast 38 miles to Peoria. The work is to be completed by May 1. The portion of this line from Bellefontaine northwest to St. Johns is completed, and it is reported that work is practically completed from the terminal of the recently acquired section of the Lake Shore & Michigan Southern into Detroit. The Ferguson Construction Co. holds all these contracts. (See this column for Oct. 1 and Jan. 7 and 28.)

El Reno & Southwestern.—This company was incorporated in Oklahoma Territory, Feb. 5, with a capital stock of $1,000,000 to build a line from El Reno southwest through the Caddo and Wichita Indian reservations, Wichita Co., the Kiowa, Comanche and Apache Indian reservations and Greer Co., to a point on the Fort Worth and Denver City railroad at or near Vernon, Tex. The incorporators are N. B. Wass, T. S. Hensley, John S. Kerfoot, Jr., J. N. McGrath, A. F. Masters, A. T. Mervell, J. F. Robinson, all of El Reno.

Fort Worth & Northwestern.—This company has been incorporated in Texas, with a capital stock of $250,000, to build a line from Fort Worth northwest about 120 miles through the counties of Tarrant, Parker, Young and Throckmorton to the city of Throckmorton. The incorporators are B. B. Paddock, W. A. Paddock, W. B. Paddock, J. H. McMillen, D. D. McMillen, Sr., D. D. McMillen, Jr., and E. T. Hollis, all of Fort Worth; R. F. Arnold and S. R. Crawford, of Young Co., and W. W. Cargill, La Crosse, Wis.



Line of the Sierra Railway of California.

Gulf, Arkansas & Northwestern.—This company was incorporated in Arkansas, Feb. 3, with a capital stock of $450,000 to build a line from the terminus of the Bentonville railroad at Bentonville, Ark., northwest about 29 miles to the Missouri state line. The incorporators are C. M. Hall, E. C. Parker, Chicago; Frank Fanning, St. Joseph; C. DeWitt Hagerman, Wymere, Neb.; L. H. McGill, J. M. Bohart, J. W. Langford, C. M. Robinson and A. E. Buchanan, Bentonville.

Kansas & Southeastern.—The Commissioners appointed by the Governor of Oklahoma Territory to appraise the damages on the right of way from Hunnewell, Kan., southwest through Parker to Kay Center, Okla., have filed their report, and it is stated that grading will begin on this section at once.

Milwaukee, Benton Harbor & Columbus.—The statement of some of our contemporaries that this company has begun preparations for a proposed extension south into Indiana is officially declared to be incorrect. The company does not know the source of the newspaper reports regarding its future plans. The fact is that the extension has not yet been fully determined upon.

Missouri, Oklahoma & Texas.—Delegate Callahan of Oklahoma Territory, has presented a bill into the House asking for right of way for this road from Henrietta, Tex., a point on the Missouri, Kansas & Texas, northeast through Oklahoma and Indian Territories to a point on the Kansas line near Chetopa, about 290 miles. At least 50 miles of the road must be built within three years, and the entire line completed within five years of the passage of the act. (See this column for Jan. 14.)

Mobile & Ohio.—It is officially stated that 98 per cent. of the grading on the extension of this line from Columbus, Miss., to Montgomery, Ala., 168 miles, has been completed, and that rails have been laid on 96 miles from Columbus to Centerville, and on 11 miles from Maplesville westward. The bridges across the Luxipalila, the Sipsey and the Warrior rivers are practically completed. The bridge across the Cahaba at Centerville is under way, and that across the Alabama at Montgomery has two spans swung. (See this column for Nov. 5.)

Muscogee Coal & Railway Co.—The Senate bill, granting the right of way to this company through Oklahoma and Indian territories, passed the House Feb. 5 and has gone to the President. The proposed road is to begin near Fort Gibson, in the Cherokee Reservation, Ind. T., and to run through the Cherokee and Creek Reservations to Vernon, Tex. (See this column for Jan. 28.)

New Orleans & Oklahoma Territory.—Delegate Callahan, of Oklahoma Territory, has introduced a bill into the House granting the right of way of 100 ft. with stations every 10 miles to this company through Indian Territory. As noted last week in this column, this road has been incorporated to build a line from near Medford, Okla., through Oklahoma Territory and Tishomingo, I. T., to Sherman, Tex.

New York, New Haven & Hartford.—The Boston & Providence, a leased line of this company has petitioned the Boston Board of Aldermen for permission to extend this line from a point at or near Dartmouth street, in Boston, to the grounds of the Boston Terminal Company, and a hearing is advertised in the City Hall, on Feb. 21, at 3 p. m.

Norfolk, Virginia Beach & Southern.—It is officially stated that the route of the extension of this road is from Kempsville, Va., southeast through Princess Anne Court House, Pinero and Creede to Munden Point, 22 miles. Surveys have been completed and right of way obtained for the whole distance, and seven miles of track have been laid. Two hundred men are at work. There are no steep grades and only one curve. When completed the extension will connect with steamboat lines operating on Currituck and Albermarle Sound. (See this column for Jan. 28.)

Northern Pacific.—An ordinance has been passed by the Council of St. Paul, Minn., granting this company right of way for a spur track connecting with the company's yards at Trout Brook and extending through the alley between Fifth and Sixth streets to Broadway. Most of the lots on both sides of the alley are owned by the Northern Pacific. The track must be completed, according to the ordinance, by June 30.

Pecos Valley & Northeastern.—This company will at once begin building the Pecos Valley extension from Rosswell, N. Mex., the present terminus, northeast 208 miles to Washburn, Tex., a point on the Atchison, Topeka & Santa Fe. It is expected that the entire line will be in operation by October next. A traffic arrangement has been made with the Atchison, Topeka & Santa Fe for interchange of business. The extension will open up a valuable cattle and sugar territory.

Queen Anne's.—The first regular schedule train was run to Lewis, Del., Feb. 1. (See this column for Jan. 28.)

St. Louis Southwestern.—A contract has been signed, according to report, between the Gulf, Beaumont & Kansas City and the St. Louis Southwestern, whereby the St. Louis Southwestern will extend its line from Lufkin, Tex., southeast about 70 miles to Kirbyville, the northern terminus of the Gulf, Beaumont & Kansas City. It is stated that the extension is to be completed within eight months. It is further reported that the new Jasper Southern from Kirbyville, Tex., northwest 20 miles, to Jasper is to become a part of the Gulf, Beaumont & Kansas City.

San Francisco & San Joaquin Valley.—Folley & Muir, according to report, have been granted the contract for building the 5,700 ft. tunnel on the extension from Stockton west to San Francisco. (See this column for Jan. 14 and for Feb. 4.)

Sierra of California.—This road has been completed from Oakdale, Cal., to Jamestown, 41 miles, and a train service of two trains per day in each direction has been in effect since Nov. 8. (See this column for Nov. 19.) The road is projected to extend to Sonora and to Angel's Camp, but no further building will be done until next summer. T. S. Bullock, San Francisco, Cal., is General Manager.

Southern.—The Waxahachie, Tex., City Council has granted the Central Texas & Northwestern line of the Southern leave to extend its tracks from the spur south of the passenger station across Rodgers street to an intersection of the track on College street in that city.

Southern Pacific.—The Austin & Northwestern line of this road, according to report, is locating a spur in Burnet County, Tex., about one mile long, from the main line to Wood's sandstone quarries.

Union Pacific, Denver & Gulf.—The report widely circulated by the press, that this company has decided to relay the tracks between Fort Collins, Col., and Cheyenne, Wy., which was torn up by the old Union Pacific when in control of this road, is officially declared to be untrue.

Western Maryland.—The report, referred to in this column for last week, that this company had begun surveys on a cut-off is officially confirmed. The proposed cut-off is on the main line from Hagerstown, Washington County, Md., to a point about one mile west of Altenwald, Franklin County, Pa. The object is to avoid the mountain grades between Cavetown and Edgemont, upon the main line, and between Midvale, on the Baltimore & Cumberland Valley line; also the heavy grades each side of Waynesboro, Pa. Preliminary surveys were begun Feb. 4. The route is generally through an open limestone country. There will be no large streams to cross and consequently very little bridging. The road has been incorporated as the Washington & Franklin.

White River, Lonoke & Western.—This company was incorporated in Arkansas, Feb. 3, with a capital stock of $350,000, to build a line from a point near Jacksonville, Pulaski County, east through Roanoke, White River, 50 miles. The first Board of Directors is J. W. Wooley, Jacksonville; J. W. Blackwood, Little Rock; Dan. Daniels, Joe P. Eagle, Lonoke; A. P. Brewer, St. Louis, Mo., and A. Bushnell, Kansas City.

Electric Railroad Construction.

Boston, Mass.—The West Roxbury & Roslindale Street Railway Co. are negotiating with the Board of Selectmen of East Dedham for an extension of the

tracks of the street railroad from the present terminus in Tracy square along Bussy street to Boyden square.

Chattanooga, Tenn.—The Chattanooga Rapid Transit Co. is seeking, by act of Congress, to extend its lines to the Chickamauga and Chattanooga National Park.

Chicago, Ill.—We are officially informed concerning the Chicago Electric Traction Co., which was organized Jan. 21, 1898, with a capital stock of $2,000,000 and a bond issue of $1,500,000, which are held in New York and Philadelphia, that the company has purchased the plant of the Englewood & Chicago Electric Street Railway Co., which now controls 26 miles of track, using the storage batteries. The company intends to make numerous extensions in the spring and will greatly increase the present equipment. It now owns 40 motor cars, one sprinkler, one sweeper and one snowplow. In the summer trailers are used. The officers are: J. S. Bache, of New York, President; Samuel R. Shipley, of Philadelphia, Vice President; Henry Levis, of Philadelphia, Treasurer; H. A. Hensley, of New York, Secretary; E. R. Gilbert, General Manager. The Directors are: J. S. Bache, Samuel R. Shipley, Isaac L. Rice, Henry Levis, Gustav J. Wetzlar, Charles R. Holden, Carl Meyer, E. R. Gilbert, William L. Tibbs, Thomas A. Moran, Jr., and Alfred S. Austrian.

Detroit, Mich.—The Detroit, Ann Arbor & Ypsilanti Electric Railway (*Railroad Gazette*, Nov. 12, 1897) has given the Union Trust Co a mortgage to secure its 6 per cent. first mortgage 20-year bonds. The total issue is $600,000.

Easton, Pa.—The Northampton Electric Railroad Co., in which ex-Congressman James Kerr and Congressman Howard Mutchler are interested, has placed a contract with George S. Good & Co., contractors of Loch Haven, for building the road. The road will run from Easton to Bethlehem in Northampton County.

Elizabeth, N. J.—John Kean has offered the Freeholders of Union County $100,000 for a franchise to build an electric railroad on Westfield avenue from Savre street in Elizabeth to Watchung avenue in Plainfield, the money to be used in widening the avenue, which is one of the finest county roads in New Jersey. A committee consisting of Freeholders Littell, Olden, King, Wahl and Swain was appointed to confer with Mr. Kean in reference to details.

Great Barrington, Mass.—The New York & Berkshire Street Railway Co. has applied to the Massachusetts legislature for a charter of incorporation. The road will extend from Monterey, N. Y., to Great Barrington. H. F. Keith, of Mt. Washington, is the chief promoter.

Hannibal, Mo.—We are informed that the bonds for the extension of the Hannibal Traction Co. will soon be issued and the road improved, so as to handle the increased traffic. New attractions in the way of parks will be established, and the "famous Hannibal Cave" will be reached. Geo. W. Chance, 14 S. Broad street, Philadelphia, and D. Thompson, Hannibal, Mo., are interested.

Jersey City, N. J.—The Consolidated Traction Co., it is stated, intends making an application for a franchise to the township committee of East Orange to operate electric cars on Central avenue. A committee from the Third Ward Improvement Society of East Orange, consisting of Charles A. Deligney, James Mackinson, Andrew W. Baigrie, and President Barradale, was appointed to wait upon the railroad authorities and urge that the application be made.

Lima, N. Y.—An electric railroad, to be known as the Lima & Honeoye Falls Railroad Co., is being organized.

London, Ont.—Application will be made to the Dominion Parliament for an act to incorporate a company to build a railway by steam or electricity or other motive power between London, Ont., and Lucan, and from Lucan to Centralia, in Huron County, to a point in or near Grand Bend, on Lake Huron.

Merion, Pa.—Supervisors A. J. Cassatt and Evan G. Jones, of Lower Merion township, have signed a permit for the Philadelphia & Merion Railway to build an electric railroad from the city line to Belmont racetrack.

Montville, Conn.—Press reports state that the Montville Street Railroad Co. (*Railroad Gazette*, Feb. 19, 97) is making applications for franchises in the towns along the proposed route of an electric railroad to connect New London and Norwich. Solomon Lucas, of Norwich, is President of the company and Charles W. Comstock, Secretary and Treasurer.

Peoria, Ill.—The Central Railway Co. has applied to the Council of Averyville for a franchise to extend double tracks along Adams street through to the end of the town.

Philadelphia, Pa.—A syndicate represented by E. W. Clark & Co., bankers, has completed arrangements for a continuous electric railroad from Wilmington, Del., to Philadelphia. The basis for the new company is the Wilmington City Railway Co. and the Chester (Pa.) Traction Co. New tracks will be laid from Marcus Hook, Pa., the southern terminus of the Chester Co. to Shellport Park, the northern terminus of the Wilmington line, a distance of six miles. The Chester Traction Co. is a consolidation by lease of the Union Railway Co., the stock of which is owned by the Traction Co., of the Chester Street Railway Co., the Chester and Media Electric Railway Co., and the Chester, Darby and Philadelphia Railway Co. The new syndicate will take charge of the management of the Chester Traction Co. when the reorganization of the company is perfected. The Union Railroad Co. will be turned over, but the Chester Street Railway and the Chester and Darby and the Chester and Media lines will maintain their organizations and be operated by the company as heretofore. The Wilmington City Railway Co. controls the Front and Union Street Passenger Railway Co., and there are 25 miles of track in the system.

The Chestnut Hill Electric Co. has been chartered with a capital stock of $10,000. Directors, Robert J. Moore, Daniel J. McNichol, Samuel F. Clevenger, William Macdonald, William N. Topham, Edward White, Samuel W. Ray, of Philadelphia.

Phœbus, Va.—The Phœbus & Fox Hill Railroad Co. expect to commence building their road from Phœbus to Fox Hill at an early date. The distance between the two towns is five miles. Among the incorporators are E. M. Tennis, J. J. Routon and S. Gordon.

Port Jefferson, L. I., N. Y.—At a recent meeting of the directors of the proposed Patchogue & Port Jefferson Traction Co., it was decided to accept the franchise as amended by the Highway Commissioners of Brook Haven. The company expects to complete its cross-island electric road this coming season.

Rising Sun, Md.—The stockholders of the Northeast, Rising Sun & Elk Neck Electric Railway have elected Directors for the ensuing year as follows: James Mallen, George W. Cosden, Mount E. Kirk, Dr. Frank H. Mackie, William L. Mearns, E. L. Duykinck, Andrew Anderson, L. O. Cameron and J. M. Carhart. James Mallen, President; George W. Cosden, Secretary and Treasurer, and L. O. Cameron, Manager. This company is incorporated by the Maryland Legislature to build an electric line from Rising Sun through Bay View to Elk River.

Saginaw, Mich.—It is reported that the Inter-Urban Railway will soon ask for such a franchise from the council of Bay City as will enable it to have an independent entrance into Bay City.

Shamokin, Pa.—The Shamokin & Mount Carmel Electric Railway Co.'s lines may be extended to Sunbury.

Three Rivers, Que.—Application will be made to the Dominion Parliament for an act to incorporate The North Shore Electric Co. to build a railroad on the north shore of the St. Lawrence, starting from Three Rivers, in the province of Quebec, and through the district of Three Rivers and other districts in the province.

Tonawanda, N. Y.—The Michigan Pipe Co., of Bay City, Mich., inform us that they will at once incorporate a new company to take the street railroad property which they recently purchased at North Tonawanda, and the Tonawanda Electric Street Railroad which extends from the Buffalo city limits through Tonawanda to the city limits of North Tonawanda, where it connects with the electric road which they purchased some 10 days ago, and to complete an electric railroad from Buffalo to Niagara Falls, N. Y. The construction will be heavy and substantial, having double track road throughout the entire distance, using 80 lb. T rails and slag and rock ballast in the rural districts and 98-lb. girder rails and creosoted wood ties in the paved streets in the cities. The electrical equipment will be larger and heavier than anything now in the vicinity of the Niagara frontier. Fifty cars 42 ft. long of the latest and most improved type will be used. A large brick car barn with a well equipped machine shop attached will be built in North Tonawanda. Contracts will be let for construction so that the road will be completed in time to open it for public traffic Oct. 1, 1898.

Wheeling, W. Va.—At the recent annual meeting of the Wheeling Railway Co. it was decided to carry to completion the plan of a park at Belle Isle, and to make other improvements, chief of which is an increase in the power plant.

GENERAL RAILROAD NEWS.

Railroad Earnings.

[Showing the gross and net earnings for the periods ending at the dates named.]

December 31:		1897.	1896.	Inc. or Dec.	
Boston & Albany.					
3 months	Gross	$2,375,564	$2,324,796	I.	$51,768
3 "	Net	1,019,768	1,075,71	D.	55,503
6 months	Gross	4,898,936	4,698 713	I.	200,223
6 "	Net	1,640,311	1,725,273	D.	84,962
Chicago & Northwestern.					
12 months	Gross	$33,571,172	$32,177,153	I.	$1,394,019
12 "	Net	12,135,918	10,950,228	I.	1,185,790
Choctaw, Oklahoma & Gulf.					
2 months	Gross	$318,203	$263,221	I.	$5,981
2 "	Net	130,002	92,473	I.	37,535
Delaware, Lackawana & Western Leased Line.					
3 months	Gross	$2,899,486	$2,571,248	I.	$328,228
3 "	Net	1,665,031	1,384,237	I.	280,794
Denver & Rio Grande.					
1 month	Gross	$760,921	$567,535	I.	$193,355
1 "	Net	273,326	216,879	I.	57,447
6 months	Gross	4,475,619	3,768,459	I.	606,190
6 "	Net	1,736,045	1,536,470	I.	250,175
Fitchburg.					
3 months	Gross	$1,969,623	$1,896,508	I.	$73,115
3 "	Net	654,862	669,741	D.	14,879
6 months	Gross	3,966,957	3,764,195	I.	202,762
6 "	Net	1,397,765	1,341,475	I.	56,290
Georgia.					
1 month	Gross	$159,106	$148,757	I.	$10,349
1 "	Net	43,547	35,797	I.	7,750
6 months	Gross	882,870	863,499	I.	19,371
6 "	Net	257,352	276,857	D.	19,205
Huntington & Broad Top Mountain.					
12 months	Gross	$509,540	$583,362	D.	$73,822
12 "	Net	241,025	299,210	D.	55,185
Kanawa & Michigan.					
6 months	Gross	$291,472	$237,944	I.	$53,528
6 "	Net	87,432	64,049	I.	23,383
Kansas City, Memphis & Birmingham.					
6 months	Gross	$632,272	$557,056	D.	$24,784
6 "	Net	173,650	203,678	D.	30,028
Long Island.					
3 months	Gross	$960,270	$839,763	I.	$20,507
3 "	Net	232,946	187,471	I.	45,475
Mexican Central.					
1 month	Gross	$1,225,110	$1,015,921	I.	$209,189
1 "	Net	475,845	312,190	I.	163,655
12 months	Gross	12,845,819	10,208,040	I.	2,627,779
12 "	Net	4,016,349	3,463,747	I.	552,602
Mobile & Ohio.					
1 month	Gross	$401,028	$367,132	I.	$33,896
1 "	Net	158,593	159,821	D.	9 8
12 months	Gross	4,012,704	3,715,759	I.	296,945
12 "	Net	1,337,561	1,270,565	I.	66,996
New England.					
3 months	Gross	$1,604,122	$1,373,555	I.	$230,567
3 "	Net	395,710	518,877	I.	26,733
New York Central & Hudson River.					
3 months	Gross	$11,888,463	$11,668,564	I.	$219,899
3 "	Net	3,858,254	3,771,246	I.	87,038
6 "	Gross	24,302,474	22,938,464	I.	1,363,810
6 "	Net	8,179,620	7,444,377	I.	735,243
New York, Chicago & St. Louis.					
12 months	Gross	$5,813,922	$5,587,766	I.	$226,156
12 "	Net	992,663	883,415	I.	109,248
New York, Philadelphia & Norfolk.					
12 months	Gross	$894,510	$915,833	D.	$51,323
12 "	Net	175,452	200,232	D.	24,780
Oregon Short Line.					
1 month	Gross	$351,682	$293,591	I.	$57,491
1 "	Net	215,593	159,330	I.	57,263
6 months	Gross	3,263,604	3,020,242	I.	243,362
6 "	Net	1,306,103	1,024,062	I.	282,341
Philadelphia, Wilmington & Baltimore.					
1 month	Gross	$741,903	$675,803	I.	$69,100
1 "	Net	169,950	143,750	I.	26,200
2 months	Gross	1,498,962	1,348,062	I.	150,900
2 "	Net	396,699	339,499	I.	57,200
Rio Grande Western.					
1 month	Gross	$270,444	$203,401	I.	$67,043
1 "	Net	95,479	69,706	I.	25,773
6 months	Gross	1,800,227	1,294,708	I.	505,519
6 "	Net	693,343	440,441	I.	252,902
St. Joseph & Grand Island.					
6 months	Gross	$659,641	$435,963	I.	$223,678
6 "	Net	255,378	67,460	I.	187,918
Spokane Falls & Northern.					
12 months	Gross	$596,910	$439 759	I.	157,151
12 "	Net	327,041	256,431	I.	70,610
Syracuse, Binghamton & New York.					
months	Gross	$226,995	$220,137	I.	$6 858
"	Net	105,789	94,406	I.	11,383
Toledo & Ohio Central.					
months	Gross	$906,430	$926,888	D.	$20,458
6 "	Net	284,051	233,261	I.	50,790
Western New York & Pennsylvania.					
1 month	Gross	$368,702	$226,186	I.	$142,516
1 "	Net	92,377	62,669	I.	29,708
3 months	Gross	928,345	791,014	I.	137,331
3 "	Net	353,985	280,913	I.	73,072
West Jersey & Seashore.					
1 month	Gross	$163,574	$152,818	I.	$10,756
1 "	Net	*15,789	*8,453	D.	24,242
12 months	Gross	2,550,910	2,554,920	D.	3,980
12 "	Net	591,922	586,888	I.	5,034

*Deficit.

Atchison, Topeka & Santa Fe.—This company has made arrangements with Kuhn, Loeb & Co., Speyer & Co., and the Guarantee Trust Company, of New York City, for a conversion of its six per cent. guarantee fund notes into new four per cent. general mortgage gold bonds, due 1995. Upon final payment of the Guarantee fund notes the general mortgage bonds will become a first lien upon the entire railroad of the Atchison, Topeka and Santa Fe Railway Company, and upon all its equipment (subject only to $754,500 of outstanding obligations covering a small fraction of the equipment which are being rapidly retired), and also upon the stocks by which the various other railroad companies embraced in its system are controlled. The general mortgage bonds are also a first lien upon all the bonds of such other railroad companies (except less than $2,200,000 of divisional bonds), such bonds being held by the trustee, together with other collaterals, as additional security under this mortgage. In accordance with this arrangement, these bankers are offering $5,000 in the new gold bonds for $5,600 in the old guarantee fund bonds, the offer remaining open for a reasonable time, but subject to withdrawal without notice.

Brooklyn & Brighton Beach.—The Receivers, on Feb. 3, applied to Judge Maddox, in the Supreme Court, for permission to issue $150,000 of the receiver's certificates to repair bulkheads and other property damaged by the storm at Coney Island.

Chicago & Southeastern.—Henry K. McHarg has begun proceedings in the United States Court of Indianapolis, Ind., to put this road into the hands of a receiver. The plaintiff is the holder of $231,000 of bonds, issued in January, 1887, and he charges that the road is insolvent and unable to pay the interest on these bonds. This road recently went into the hands of a receiver for a few weeks. (See this column for Dec. 31.)

Chicago Junction Railway.—On Feb. 1, at Chicago, President John A. Spoor announced the consolidation under one management, having the above name, of three lines that have heretofore been competitive, the effect of this move being to extend the facilities of the Union Stock Yards & Transit Co. The terms of consolidation have been arranged and will shortly be ratified by the stockholders at a special meeting. The three roads included are the Chicago, Hammond & Western, the Chicago & Indiana State Line Railway and the Union Stock Yards & Transit Co., having a total mileage for the consolidated roads of 297.27 miles. The Chicago, Hammond & Western extends from Whiting, Ind., to Hammond, thence Westerly to Blue Island, thence to Franklin Park, forming a belt line of 60.27 miles outside and around the city, and connecting at Franklin Park with the Chicago, Milwaukee & St. Paul. The Chicago & Indiana State Line extends from a connection with the tracks of the Stock Yards Co. 3.75 miles, and in December last lease was made to this company of the entire system of tracks belonging to the Union Stock Yards & Transit Co. Through the tracks of the Stock Yards and by an operating agreement with the Terminal Railroad Co., the Stock Yards system is connected with the Chicago, Hammond & Western at Chappell.

Cleveland, Cincinnati, Chicago & St. Louis.—Notice is given that seven of the Cincinnati, Indianapolis, St. Louis & Cleveland consolidated 6 per cent. mortgage bonds have been drawn for payment, at 105 per cent. with accrued interest, and that interest will cease on the same after May 1.

Columbus, Hocking Valley & Toledo.—Judge Sage, in the United States Circuit Court, at Columbus, O., has extended the Receivership of this road to include the Ohio Land & Railway Company, the Hocking Coal & Railway Company, the Wellston & Jackson Belt and the Gallipolis & Mt. Pleasant Street Railway Company, under the old Receiver, N. Monsarrat. B. R. Cowan was appointed Special Master to examine accounts of all the properties and make report to the Court. This order was under the petition of the Central Trust Company of New York.

Galveston, Laporte & Houston.—The Planters' and Mechanics' Bank, of Houston, Tex., on Feb. 1, filed a petition in the United States Circuit Court asking for the sale of the property of this company, now in the hands of a Receiver. This line extends from Brady Junction, Tex., to Galveston, 51.3 miles, with two branches aggregating 5.7 miles. A Receiver was appointed Jan. 7, 1895.

Mexican Southeastern.—On application of E. L. Bartlett, of Santa Fe, N. Mex., the Court has appointed H. W. Leman, Vice-President of the Chicago Title & Trust Co., Receiver of this company, which is the successor of the Mexican & Guatemala Colonization & Railroad Co. The petition in the case sets forth that the corporation reorganized under the laws of New Mexico with a capital stock of $10,000,000, secured valuable concessions and franchises from the Mexican government on certain conditions, which the company has failed to comply with. It charges the officers with wilful neglect and mismanagement. (For description of this road with map see these columns for Dec. 24.)

New York Central & Hudson River.—At a special

meeting of the Board of Directors, held in New York City, Feb. 4, it was voted to authorize the issue of $100,000,000 gold collateral trust mortgage 3½ per cent. 100 year bonds for the purpose of acquiring the stock of the Lake Shore & Michigan Southern, on the basis of one $1,000 bond for five shares (par value $500) of Lake Shore stock. President Chauncey M. Depew, of the New York Central & Hudson River, gave out the following statement:

"The New York Central & Hudson River Railroad Directors met this morning and passed the necessary resolution for the purchase of stock of the Lake Shore Railroad Co. The Vanderbilts and others represented by them have sold to the New York Central their holdings of the capital stock of the Lake Shore & Michigan Southern Railroad Co. and in exchange for every five shares of such stock accepted on gold bond of the New York Central for $1,000, bearing 3½ per cent. annual interest and payable in 100 years. The Messrs. Vanderbilt made this sale upon the express provision that the same terms should be offered to all holders of the stock of the Lake Shore, and that such offer should remain open for acceptance by the Lake Shore stockholders for the period of at least 60 days. All shares of the stock of the Lake Shore Railroad Co. acquired and owned by the New York Central are to be held in trust as collateral for such gold bonds. The New York Central Board were of the opinion that inasmuch as the close relations which have existed between the Lake Shore and the New York Central for over a quarter of a century were dependent entirely on the personal holdings of the stock of the two companies, it was very desirable and necessary if possible to make certain a permanent connection between the two lines."

Commenting on this announcement Mr. Depew said: "There is no doubt that this action is of benefit to both companies and to the stockholders of both companies, and also to the public and to the city of New York. Under the authority of the Board this morning the New York Central will purchase on similar terms to those accepted by the Messrs. Vanderbilt and their friends any part of the stock of the Lake Shore Railroad Co. which may be offered, and an official notice to that effect will be published in a few days."

The Lake Shore & Michigan Southern owns and controls by lease 1,439.66 miles of railroad, of which 540.04 miles represents the main line from Buffalo to Chicago. The capital stock to be exchanged under the above terms, is $49,466,500; the remainder of the $50,000,000 capital stock being preferred. The company has authorized the issue of $50,000,000 of new 3½ per cent. consols to retire the old bonds, maturing from 1898 to 1903, amounting to $43,192,000, the balance to be used for general purposes. The present New York Central & Hudson River Co. owns and controls 2,635.17 miles of the road, of which 441.75 miles represents the main line from New York to Buffalo. The capital stock is $100,000,000. A few months ago the company authorized the issue of $100,000,000 of 100-year consolidated 3½ per cent. gold bonds, with which to refund its old bonds aggregating $70,877,333, and to make improvements on the road. These bonds are being offered at 103 per cent. with interest.

Northern Pacific.—Holders of Northern Pacific railroad and land grant general first mortgage sinking fund 6 per cent. gold bonds are notified that the company will convert the same into new prior lien 4 per cent. bonds on the basis of $1,325 prior lien bonds for $1,000 of the old bonds, the offer to terminate March 15. There are $11,505,000 of these bonds outstanding.

Pine Bluff & Eastern.—The final transfer has been made of the property of this company to the newly incorporated Pine Bluff & Arkansas River, and it is said to be the intention of the new company to extend the road seven miles in the direction of Gillett, Ark. The road now runs from Rob Roy to English, 23 miles. (See this column for Jan. 14.)

St. Paul & Duluth.—It is announced that $7,000,000 consolidated four per cent. mortgage bonds are to be issued by this company, of which $3,000,000 is reserved to retire the first and second mortgage five per cents at maturity, and $2,000,000 to retire the branch line five per cents and six per cents. The balance will be used for equipments and improvements. By this refunding over $40,000 interest will be saved annually.

Southeastern & Atlantic.—The name of this company has been changed to the Norfolk & Portsmouth Belt Line. The company is building a belt line around the cities of Norfolk and Portsmouth, Va., on which a large portion of the grading has been completed. (See this column for Dec. 24.)

Southern.—This company will receive proposals prior to Feb. 18 to sell Georgia Pacific equipment five per cent. mortgage bonds ($568,000 outstanding) of July 17, 1889, at a rate not to exceed par and accrued interest, the total amounting to not more than $48,867.

Terre Haute & Indianapolis.—The Pennsylvania Company has brought suit against this company to recover $75,000 in the form of notes, executed in 1896, in favor of the Pittsburgh Locomotive & Car Company, and assigned to the Pennsylvania Company. If payments cannot be made by Receiver Malott, the road must be sold to satisfy the claim.

Union Pacific.—At the sale, under the collateral trust gold notes deed, which took place in New York City Feb. 2, Kuhn, Loeb & Co., representing the Reorganization Committee, bid $1,650,000 for the $4,890,000 Union Pacific gold bonds, and $1,630,000 for the $5,000,000 Kansas Division and collateral trust five per cents. Notice is given to the holders of these collateral trust bonds that J. P. Morgan & Co., in behalf of the committee, is prepared to redeem the unpaid balance of principal, $375, with interest at six per cent on this balance from Feb. 1 to date of surrender, not later than Feb. 19, when interest will cease. The holder of each certificate, upon surrender, will be entitled, under the agreement of Feb. 15, 1897, to receive one and a half shares of preferred stock in the new Union Pacific Company. Fractions of a share will be adjusted by purchase or sale at the option of the holder. Holders of Mercantile Trust Company reorganization certificates for Union Pacific first mortgage six per cent. and sinking fund eight per cent. bonds, Omaha bridge renewal five per cent. bonds and Union Pacific purchase money certificates are notified that the Mercantile Trust Company of New York is prepared to issue certificates in exchange for these certificates.

Wheeling & Lake Erie.—The Reorganization Committee has been changed to include representatives of each class of securities as follows: Gen. Lewis Fitzgerald, representing the Wheeling Division first mortgage bonds; George Coppell, of Maitland, Coppell & Co., representing the Lake Erie first mortgage bonds; J. Kennedy Todd, of J. Kennedy Todd & Co., representing the consolidated four per cent. bonds; Eugene Delano, of Brown Bros. & Co., representing the first mortgage extension and improvement bonds, and William A. Dick, of Dick Bros. & Co., representing the stockholders. It is expected that a plan of organization satisfactory to these various interests will be speedily agreed upon.

Electric Railroad News.

Boston, Mass.—The Norfolk Suburban Street Railway Company has petitioned the Railroad Commissioners for permission to increase its capital stock $100,000, and to issue first mortgage bonds amounting to $250,000.

Brooklyn, N. Y.—The reports of the Brooklyn Heights R. R. Co. and the Brooklyn, Queens County & Suburban R. R. Co for the quarter ending Dec. 31, 1897, show as follows with comparisons for the same quarter of 1896:

Brooklyn Heights Railroad Company:	1897.	1896.
Gross earnings from operation	$1,110,371	$1,064,171
Operating expenses	660,277	632 798
Net earnings	$450,094	$430,373
Income from other sources than operation	58,638	59,614
Gross income from all sources	$508,732	$489,987
Taxes and fixed charges	478 308	$181,486
Net income from all sources	$30,424	$8,501
Net income as previously reported for preceding quarter	$76,451	$71,745

The operating cost for the quarter ending Dec. 31, 1897, was 59.4 per cent. of the earnings excluding taxes, and 63 per cent. including taxes.

Brooklyn, Queens County & Suburban Railroad Company.	1897.	1896.
Gross earnings from operation	$186,975	$178,218
Operating expenses	106,261	115,467
Net earnings	$80,714	$62,751
Income from other sources than operation	7,565	2,157
Gross income from all sources	$88,279	$64,908
Taxes and fixed charges	90,759	89.283
Net income from all sources (deficit)	$2,520	$24,375
Net income as previously reported for preceding quarter (surplus)	15,107	1,891

The operating cost for the quarter ending Dec. 31, 1897 was 54 62 per cent. of the earnings excluding taxes, and 58.14 per cent. including taxes.

The gross earnings of the lines of the Brooklyn Rapid Transit Co. for January were as follows:

January:	1898.	1897.
Passenger earnings B. H. R. R. and B., Q. Co. & Sub	$395,747	$376,423
Other earnings from operation	19,063	15,863
	$414,810	$392,286
7 months ending Jan. 31, 1898:		
Passenger earnings B. H. R. R. and B., Q. Co. & S. R. R.	$3,097,160	$3,000,150
Other earnings from operation	122,990	129.416
	$3,220,150	$3,129,566

Dallas, Tex.—The Dallas Consolidated Electric Street Railway Co. has been chartered with a capital of $1,000,000. This is a reorganization and consolidation of the roads in which C. H. Alexander and E. A. Ellis are interested. It is understood that Mr. Alexander will be President and General Manager of the company, and Mr. Ellis Treasurer.

Hoboken, N. J.—An order of the United States Supreme Court was served on Corporation Attorney Minturn, of Hoboken, showing that John L. Heins, President of the New Jersey Electric Railroad, better known as the Rutherford road, which runs cars between Paterson and Hoboken, had been appointed Receiver for that company. City Attorney Minturn will make an application to the United States Court to have the city of Hoboken made a co-defendant with the Rutherford company in the suit now pending. The Mercantile Trust Company, of New York, began suit against the Rutherford company, which resulted in the appointment of the Receiver.

Knoxville, Tenn.—It is stated that the Knoxville Street Railway Co. and the Citizens' Railway Co. have joined issues, and that the Knoxville Street Railway Co. will be organized.

Michigan City, Ind.—Press reports state that I. I. Spiro has been appointed Receiver of the Lake Cities Electric Railroad Company, of Michigan City. The liabilities are estimated at $30,000, with assets not known.

Ridgefield, Conn.—A controlling interest in the Ridgefield & New York Railroad Co. has been purchased by R. J. Walsh, of Greenwich, former Secretary of State. This company has been in existence a number of years, and work was once commenced at Portchester, but was abandoned. The stockholders became discouraged and were willing to sell cheaply. Judge Walsh is a stockholder in the electric roads which have secured charters for Greenwich.

Syracuse, N. Y.—The Syracuse & East Side Railway Co. proposes to increase its capital stock from $250,000 to $375 000. A stockholders' meeting will be held Feb. 17, to consider the proposition to lease the road to the Syracuse Rapid Transit Railway Co. for a period of 25 years.

Toledo, O.—J. C. Beatty has been elected President of the recently organized Toledo & Ottawa Beach Railroad Co.

Westport, Conn.—The Westport & Saugatuck Street Railway Co., press reports state, was sold Feb. 5 to a Mr. Tomlinson, of New York, who furnished the greater part of the money to build the road. The price stated is $10 a share of par value of $100. The last report of the company to the Connecticut Railroad Commission showed that it had $40,000 capital, all paid in as cash; a funded debt of $8,000; an unfunded debt of $30,541, and accounts payable of $4,684. The road is about five miles long.

TRAFFIC.

Traffic Notes.

Press dispatches from California state that the shipments of oranges to the East now amount to from 50 to 125 carloads a day.

The movement of cotton through New Orleans is now the heaviest on record. On Jan. 29 the quantity in store at New Orleans was 560,000 bales. The receipts for January were about 500,000 bales.

The Weighing and Inspection Bureau at Indianapolis saved during the year 1897 the sum of $103,841. The five bureaus, at Indianapolis, Terre Haute, Vincennes, Evansville and Louisville, saved $260,925.

The State Railroad Commissioners of Missouri, in the case of Hughes against the Chicago, Rock Island & Pacific, have decided that violation of the long and short haul rule, by the road named, on shipments from Edgerton to Kansas City, is not warranted by competition or by volume of business, and is unlawful. The road is ordered to pay overcharges amounting to $424.

St. Paul newspapers report a considerable number of passengers passing through that city for Puget Sound, bound for the Klondike gold regions. It does not appear that extra trains have had to be run, but parties of from 10 to 30 men appear to be numerous. The Northern Pacific will put on an additional through train Feb 13, to run through in five hours less time than the present train.

Railroads leading out of Cincinnati have discovered that they have sold considerable numbers of half rate charity tickets on orders purporting to have been issued by the Mayor of the city, but which were made out by scalpers or other thieves. It appears that it had been customary to accept these orders without a written signature, so that the making of fraudulent orders became easy. Joseph and Lyman Hess and Samuel Phillips have been arrested.

The car ferries across Lake Michigan have had considerable trouble with ice lately, and it is said that the boats of the Ann Arbor railroad will not attempt to run to Menominee until spring. This company's boat running from Manitowoc is carrying to the road 125 cars of flour a day. At Ludington the boats were unable to get into the harbor for five days. During the month of January the number of barrels of flour carried across the lake by all lines is reported to have been 281,319. The Grand Haven line took 174,260 barrels and the F. & P. M. 50,109.

The Southern Pacific reports total transcontinental shipments eastward during the month of December of 48,683 tons. For the month and for the calendar year 1897 the totals were, in tons:

	December.	Year.
San Francisco	19,853	219,943
Oakland	2,342	26,695
Sacramento	6,567	125,508
San Jose	4,034	56,615
Stockton	8,180	26 909
Marysville	3,236	32,932
Portland	4,631	40,645
Total	48,683	589,238
In 1896	28 379	473,211
In 1895	28 483	513,330
In 1894	27,726	545,084
In 1893	25,241	449,190

It is said that freight rates to Texas will be advanced Feb. 15 and Western press dispatches say that the tariffs from St. Louis will be advanced from the basis of 70 cents (first class) to $1.30; but very little additional information has been given out in regard to the meeting of Southwestern lines held in New York last week. An agreement was reached between the rail and water lines whose representatives attended that meeting, but the dearth of information given out regarding the action may be taken as indicating that all the interests involved have not yet fully agreed to a restoration. New York papers say that the Lone Star line, the new concern which occasioned the war, has not yet agreed to make an advance. Railroad traffic officers seem confident, however, that all differences between the water and rail lines will have been settled before the date for the advance.

Chicago Traffic Matters.

CHICAGO, Feb. 9, 1898.

The Chicago-Denver lines have had quite a snarl over fast trains and passenger rates. As announced in the *Railroad Gazette* of last week, page 85, the Northwestern and the Burlington both put on new trains to and from Denver (the time is the same by both, 28½ hours). The Santa Fe and the Rock Island roads took exception to this action, of course, and at once announced a reduction of $5 in the fare to Denver, but this was immediately met by the others. After wrangling several days a compromise was arrived at on Saturday, whereby the fast trains began running Feb. 6 but the cut rate was not actually adopted. The outcome of the whole matter is likely to be quicker time to Kansas City over the Santa Fe and the Rock Island lines to offset the run to Denver over the other roads.

The subject of Klondike passenger rates has been referred for settlement to a committee made up of vice-presidents, the Western passenger men failing, after two weeks of disputing, of reaching any solution of the difficulty, owing to the unyielding attitude of the Canadian Pacific.

The roads running between Chicago and Peoria have buried the hatchet; and passenger rates, which since last summer have been down to $3, have been restored to the normal basis, $4.25.

During the month of January over 18,000 of the Central Passenger association interchangeable mileage books were sold. This remarkable increase over any other month is said to be due to a rush of purchasers before the names of the ten Michigan lines were erased from the tickets.

Beginning to-morrow Wagner sleeping cars will take the place of Pullman's on the Chicago, Indianapolis & Louisville, between this city and Cincinnati and Louisville.

Eastbound freight rates out of Chicago are being cut daily, one line making a 15-cent rate on grain direct to New York, and other lines making a 10-cent rate via Newport News. All the cutting is on export business.

No more low excursion rates are to be made by the lines in the Western Passenger Association until Congress has taken action on the anti-scalping bill.

Eastbound shipments from Chicago and Chicago junctions to points at and beyond the Western termini of the trunk lines for the week ending Feb. 3 amounted to 105,446 tons, as compared with 91,445 tons the preceding week. This statement includes 53,341 tons of grain, 8,893 tons of flour and 13,966 tons of provisions, but not live stock. The following is the statement in detail for the two weeks:

Roads.	Week Ending Feb. 3.		Week Ending Jan. 27.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio	5,942	5.6	5 959	6.5
C., C., C. & St. Louis	7.372	7.0	5,619	6.2
Erie	13,363	12.7	11,093	12.1
Grand Trunk	12,897	12.2	8,574	9.4
L. S. & M. S.	15,043	14.3	12,563	13.7
Michigan Central	10,817	10.3	13,023	14 3
N. Y., Chi. & St. L.	9 512	9.0	9,323	10.2
Pitts., Cin., Chi. & St. Louis.	10,564	10 0	8.959	9.8
Pitts., Ft. Wayne & Chicago	14,625	13.9	11.994	13.1
Wabash	5,311	5.0	4,328	4.7
Totals	105,446	100.0	91,445	100.0